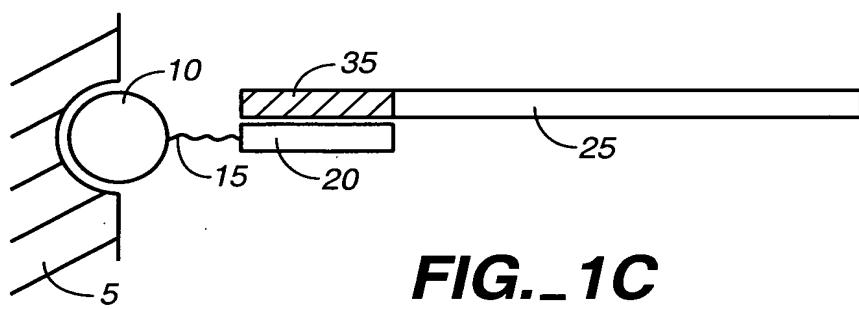
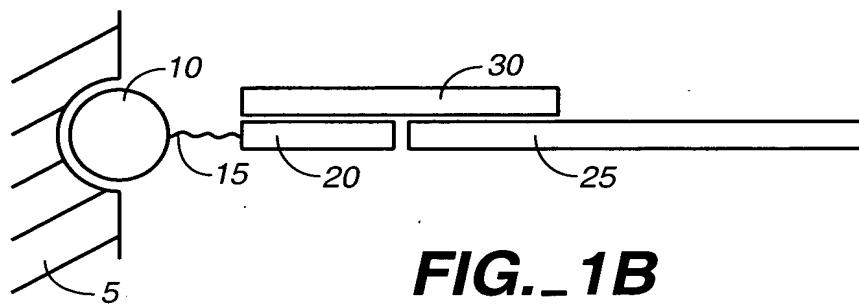
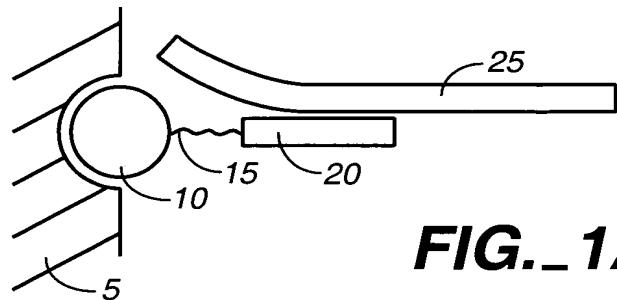
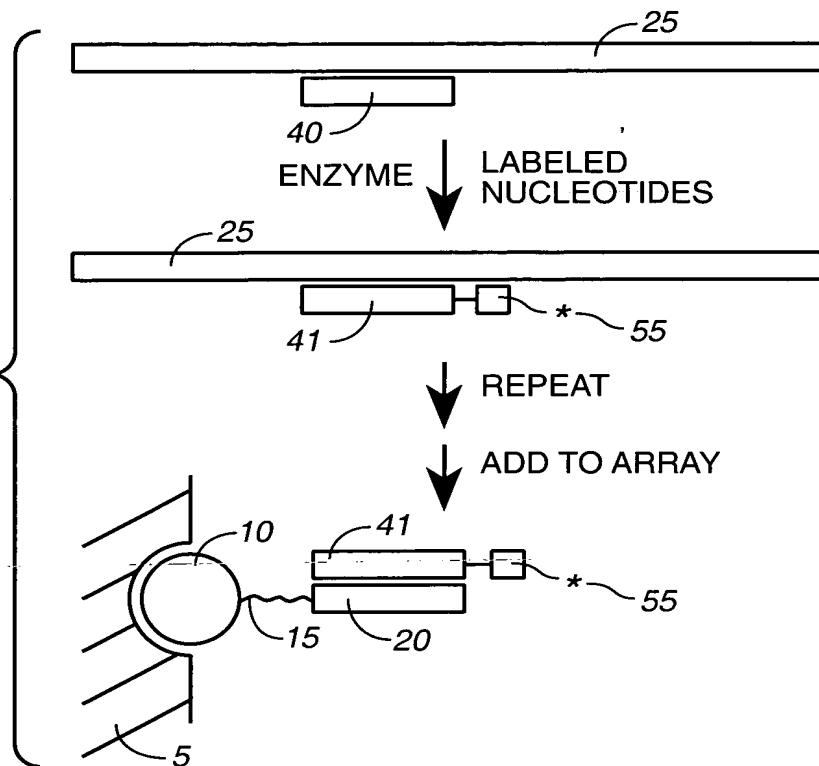
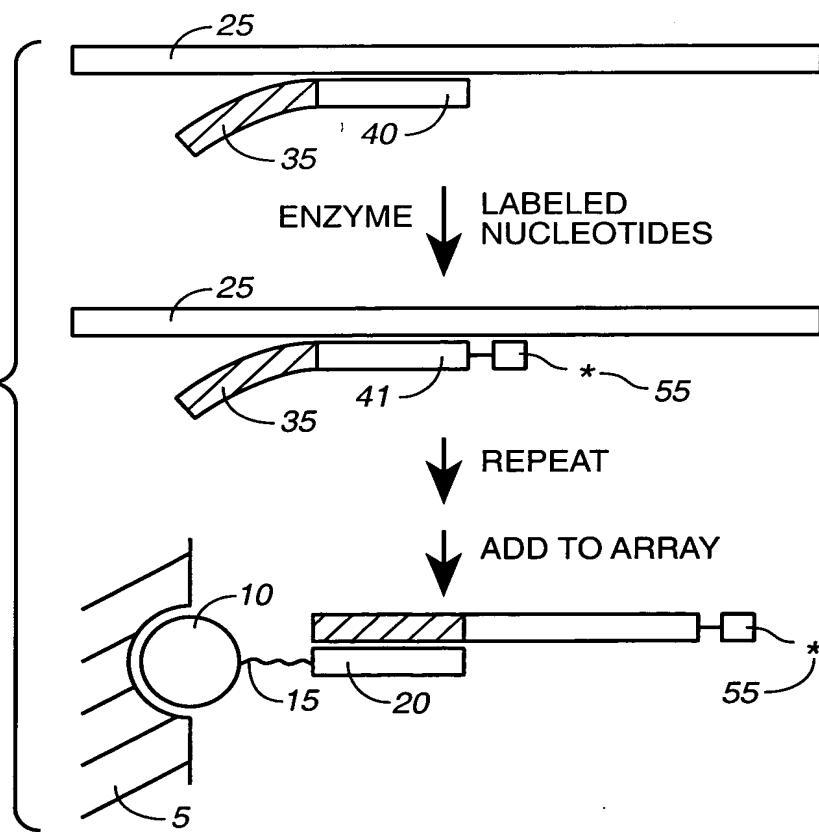


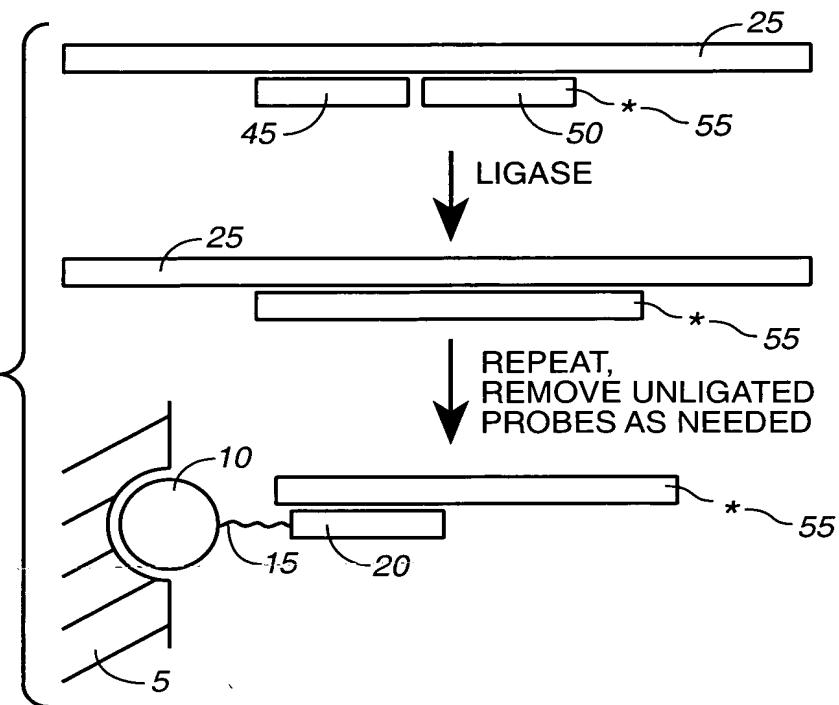
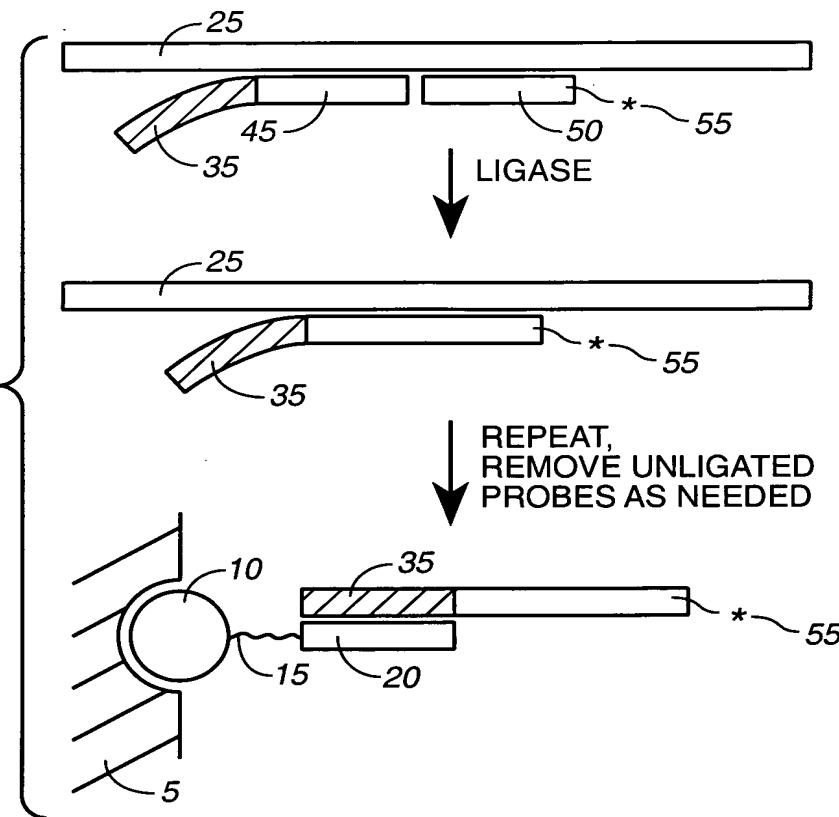
Please enter the following substitute drawings and consider the remarks herein.

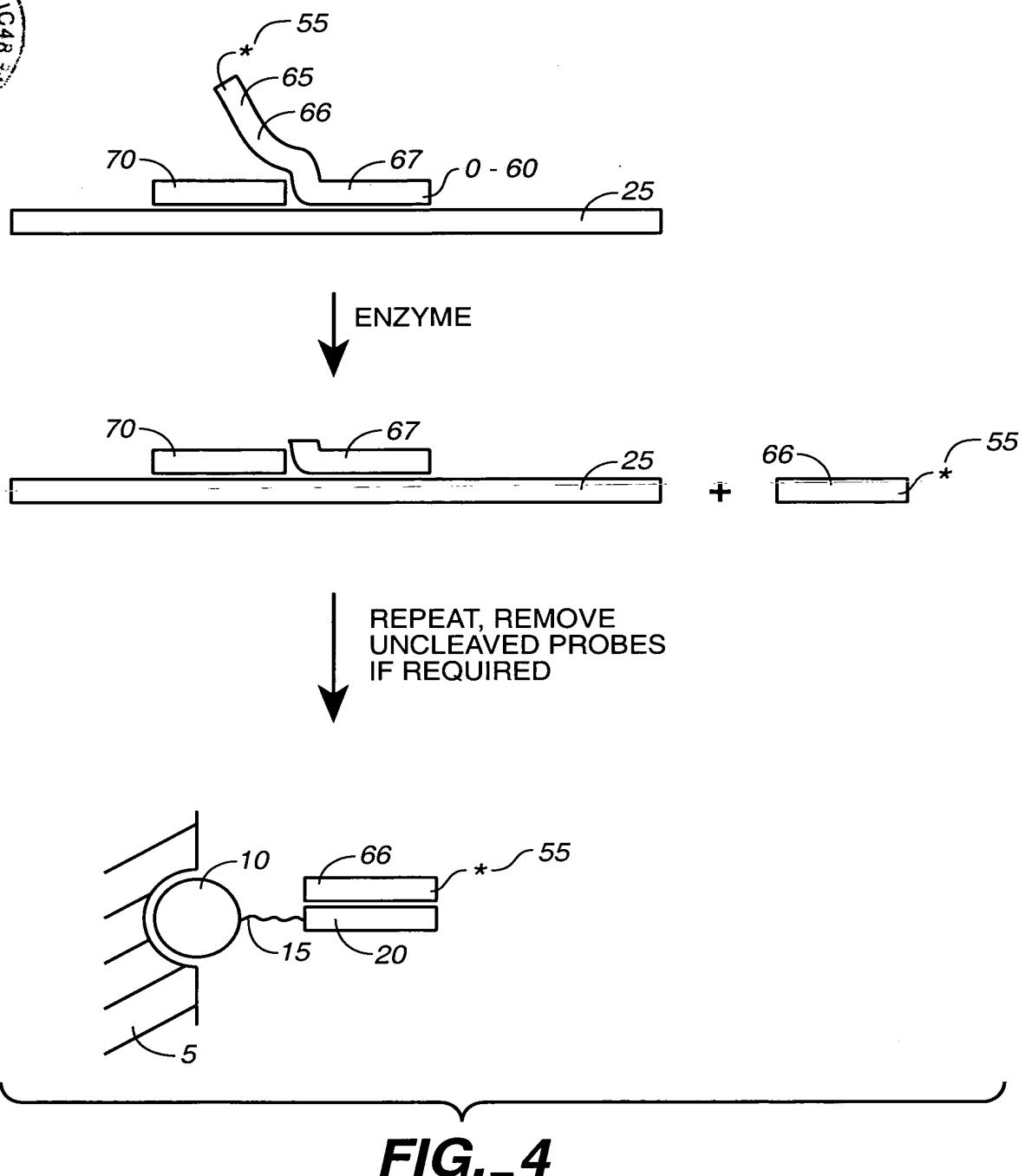
**IN THE DRAWINGS**

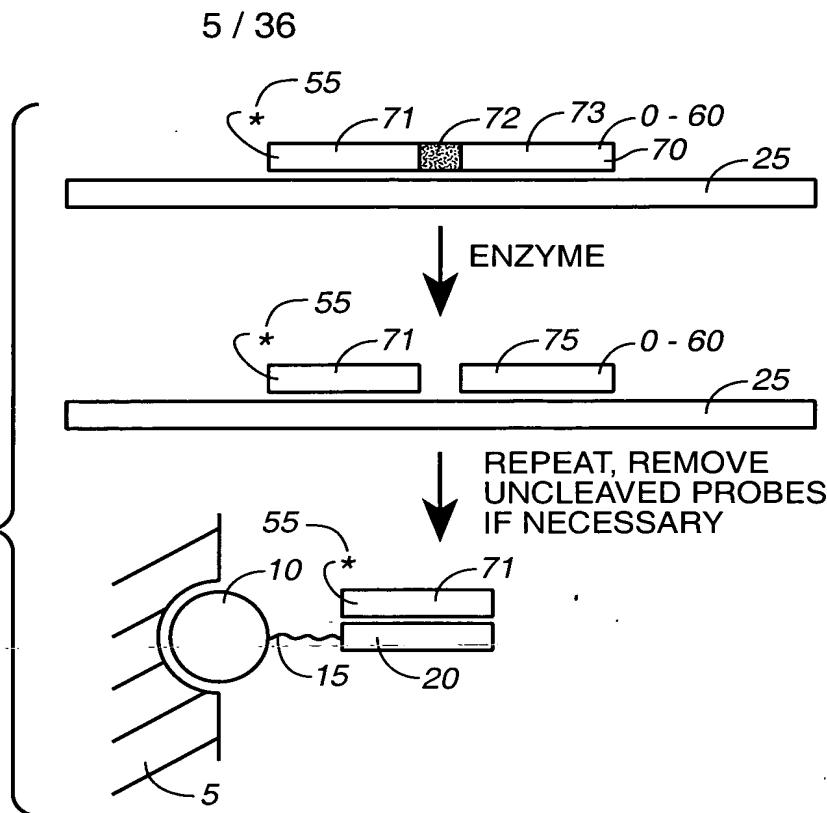
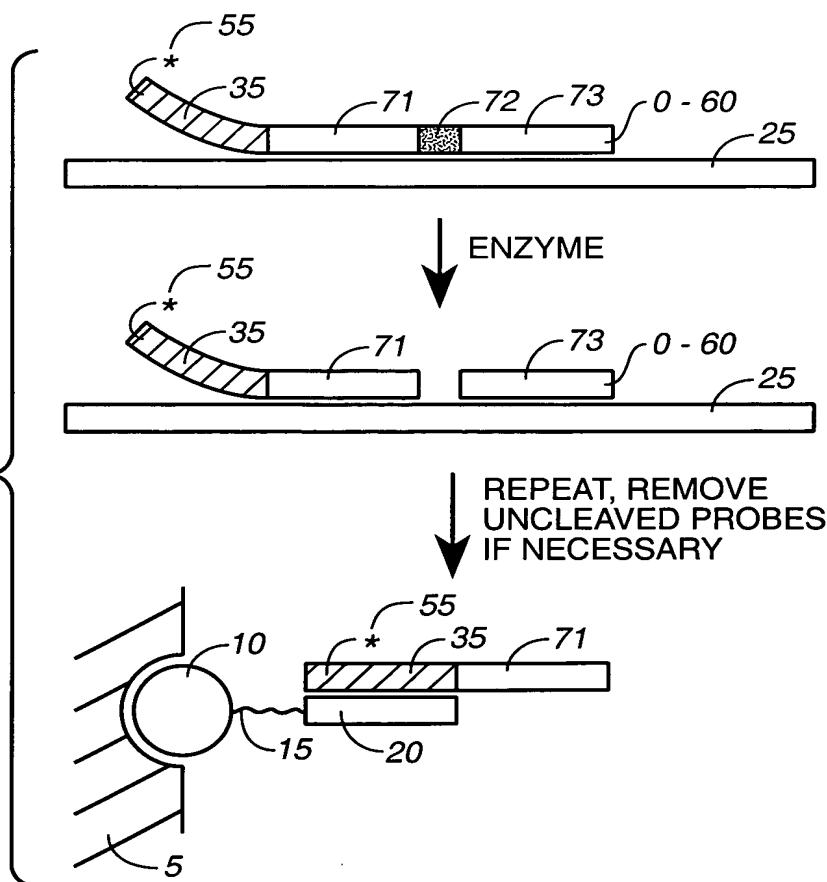
Please replace the original drawings as filed with the substitute drawings submitted herein.

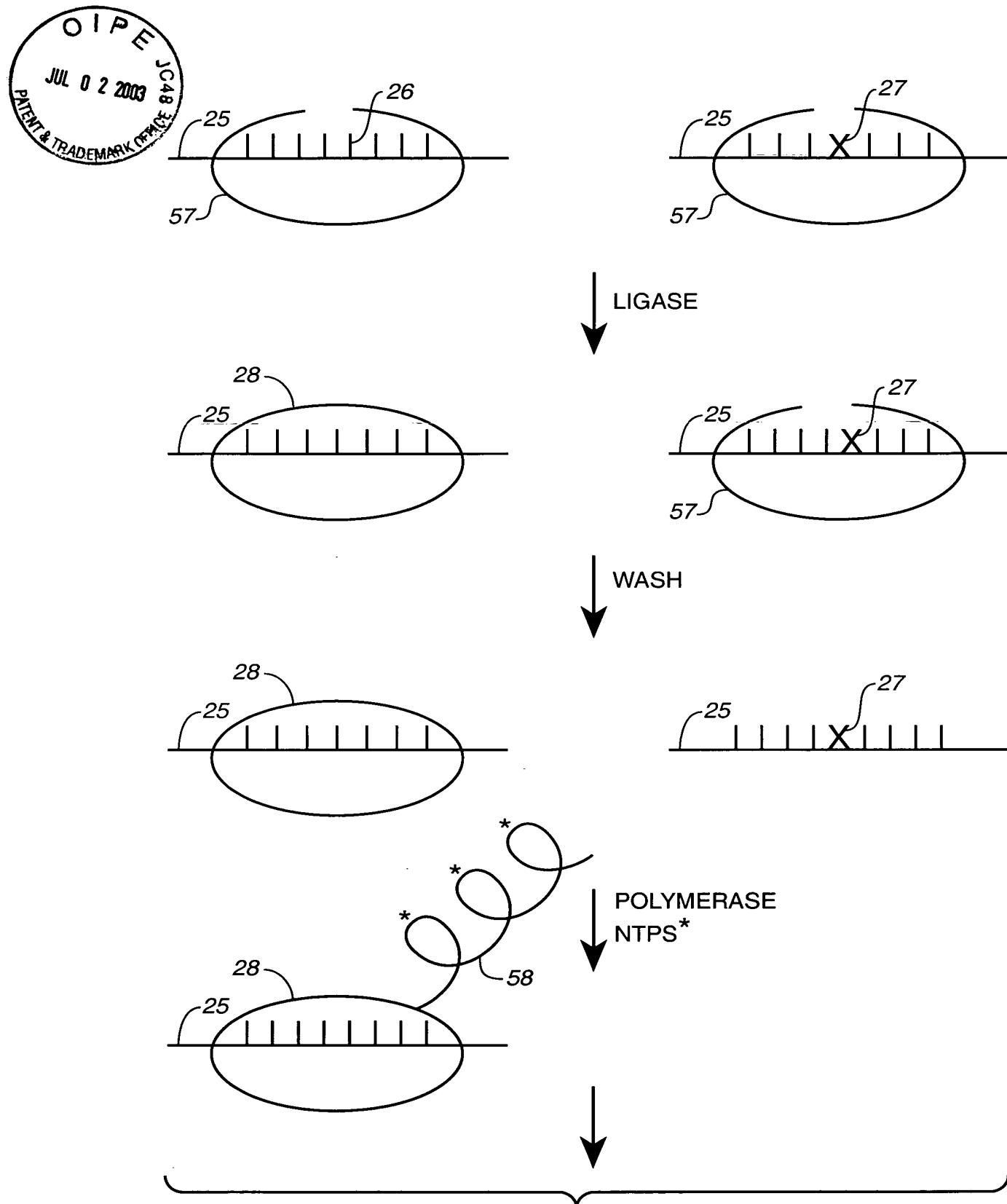


**FIG.\_2A****FIG.\_2B**

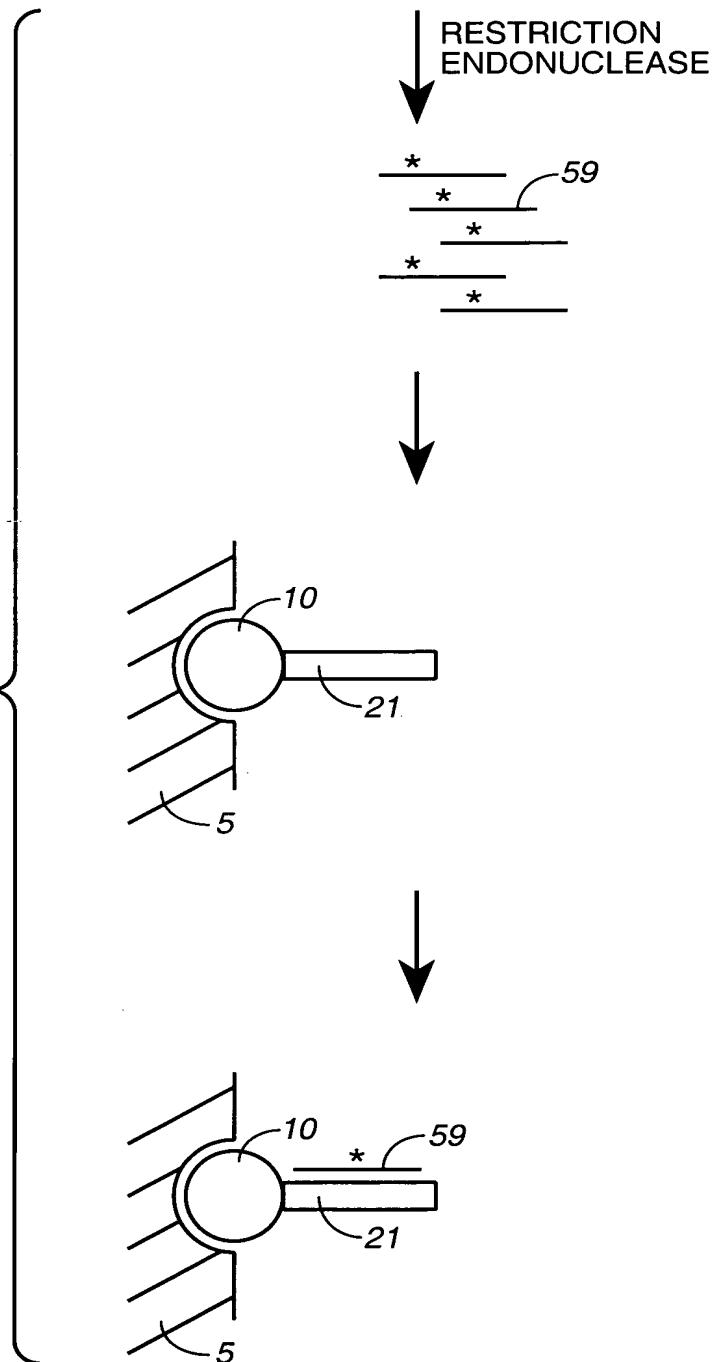
**FIG.\_3A****FIG.\_3B**

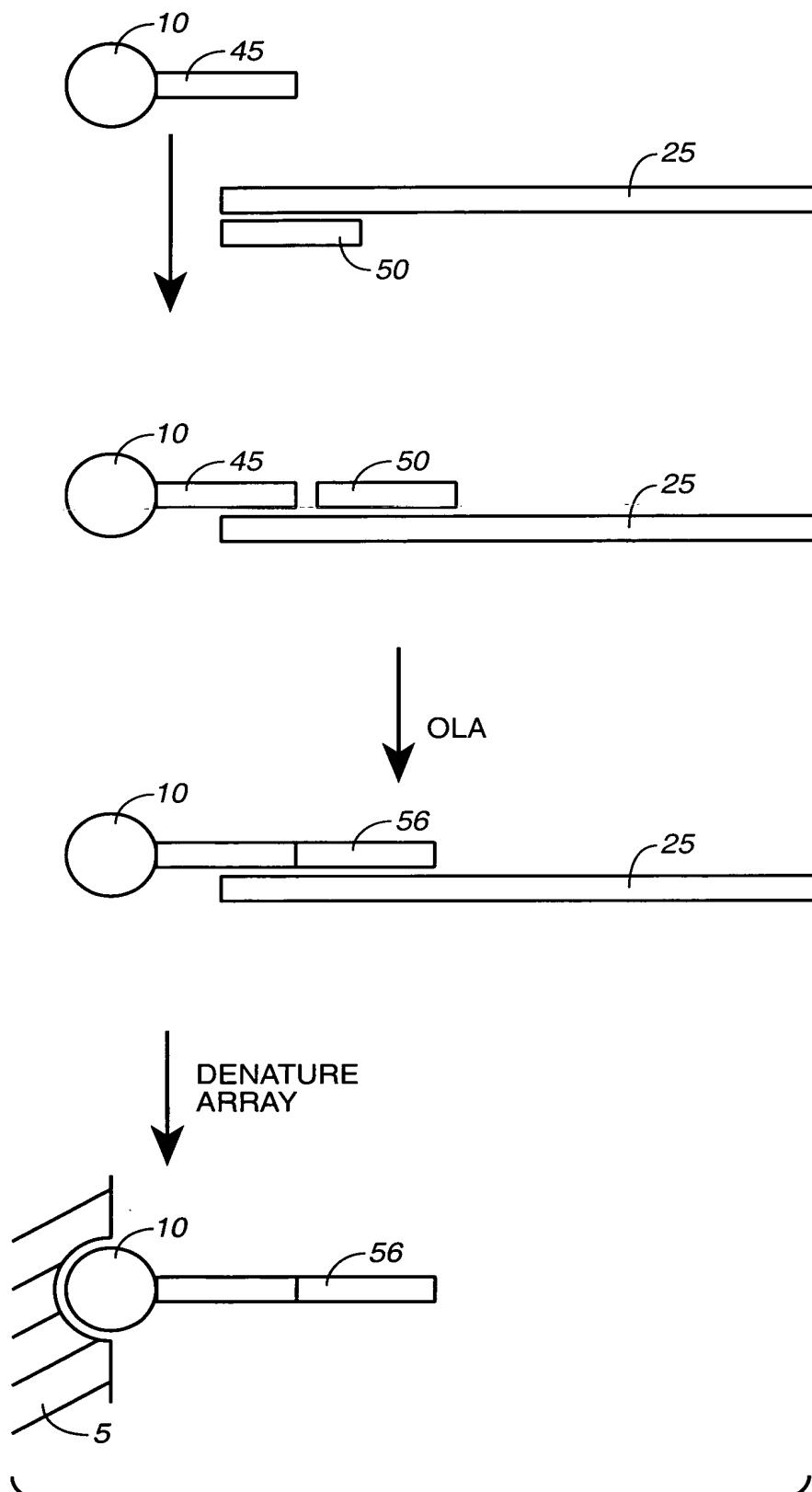
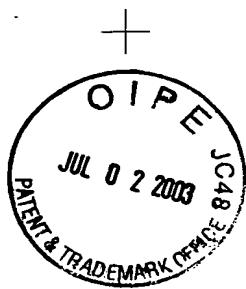


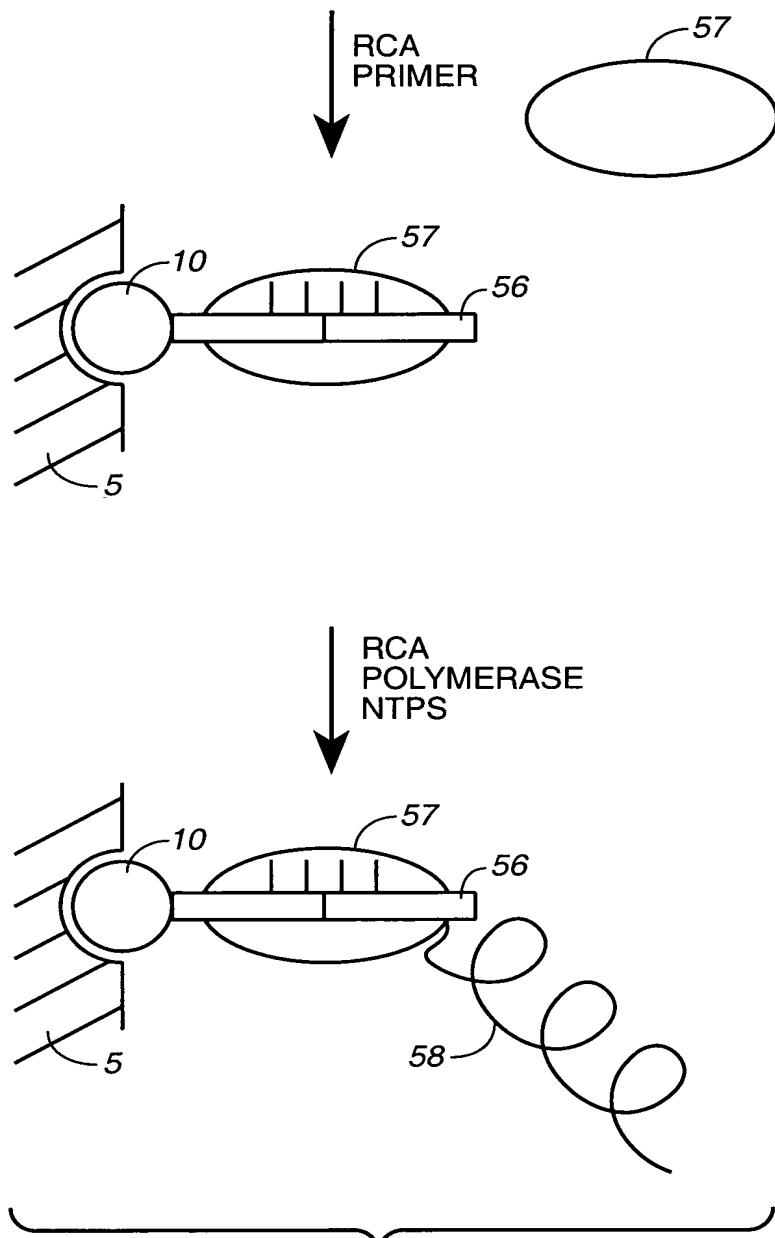
**FIG.\_5A****FIG.\_5B**



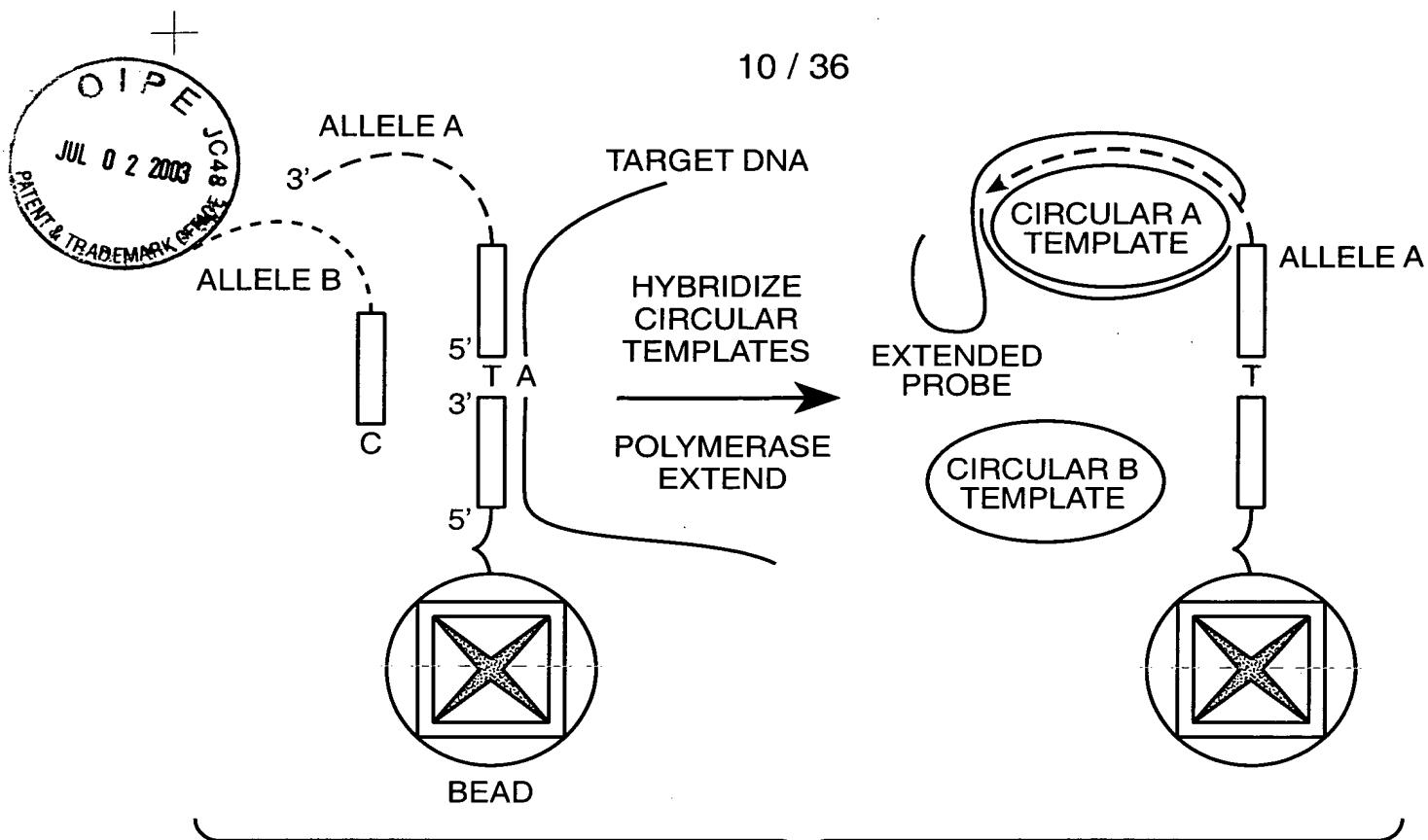
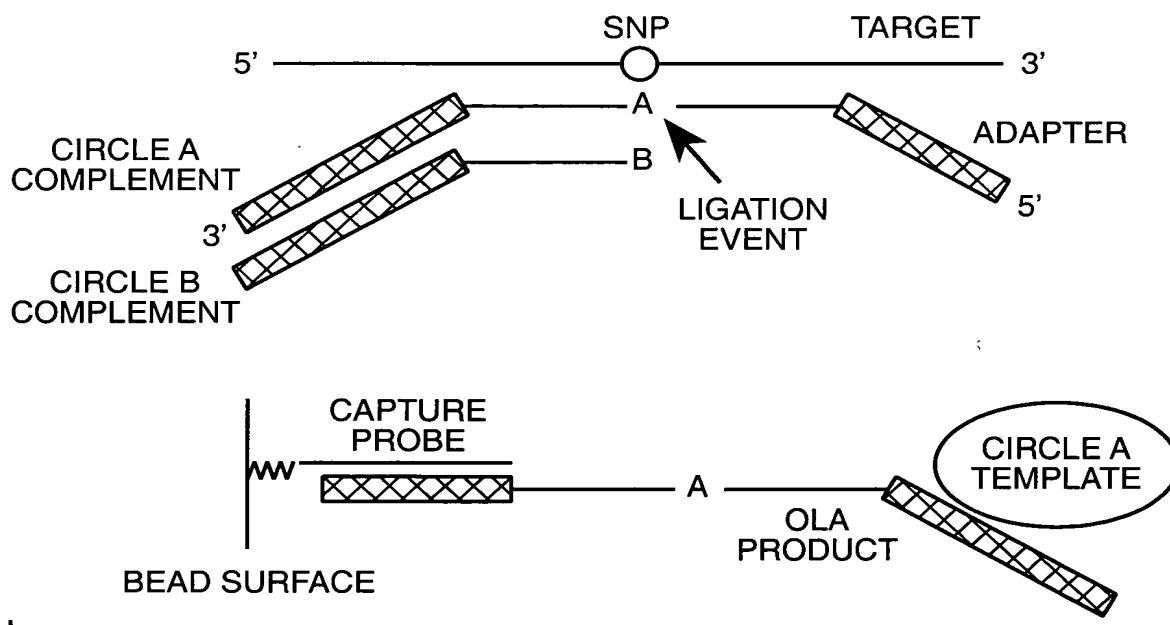
**FIG.\_6A**

**FIG.\_6B**

**FIG.\_7A-1**



**FIG.\_7A-2**

**FIG.\_7B****FIG.\_7D**

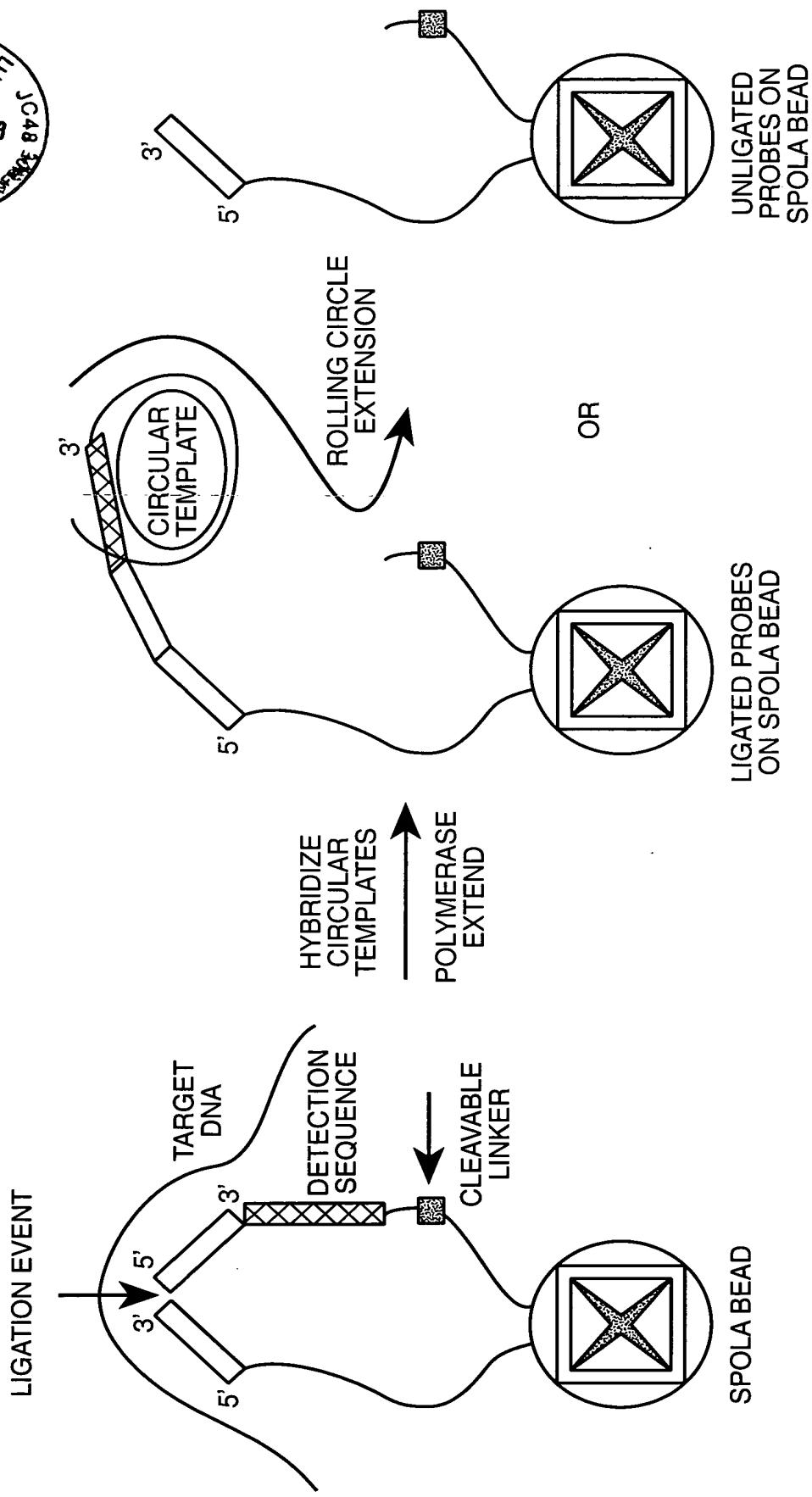
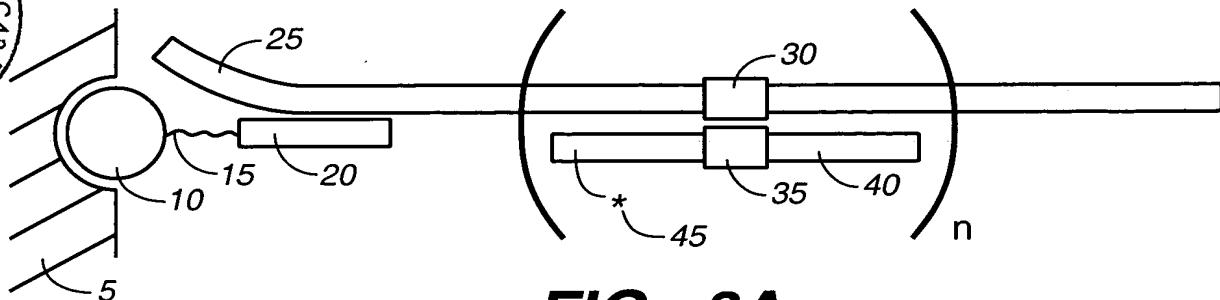
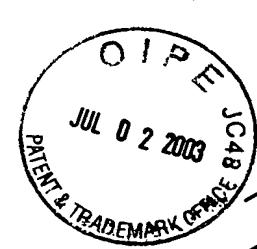
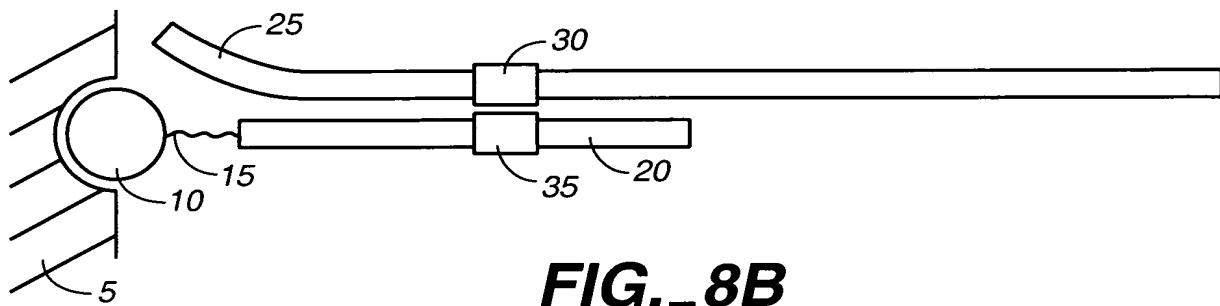
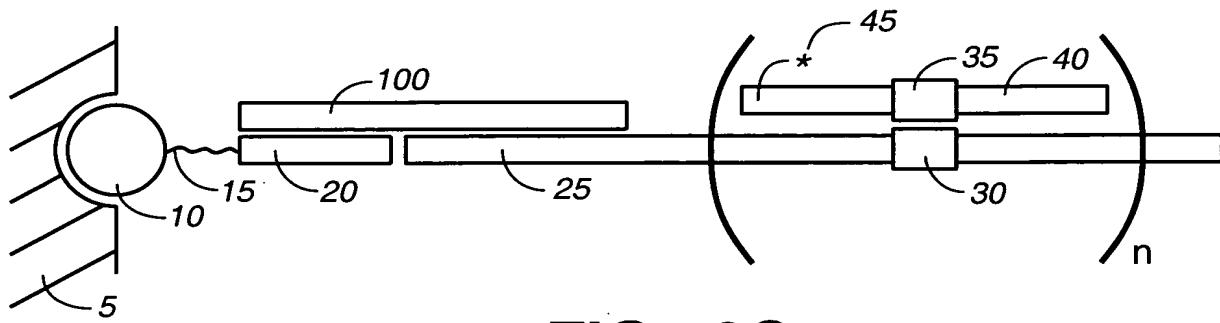
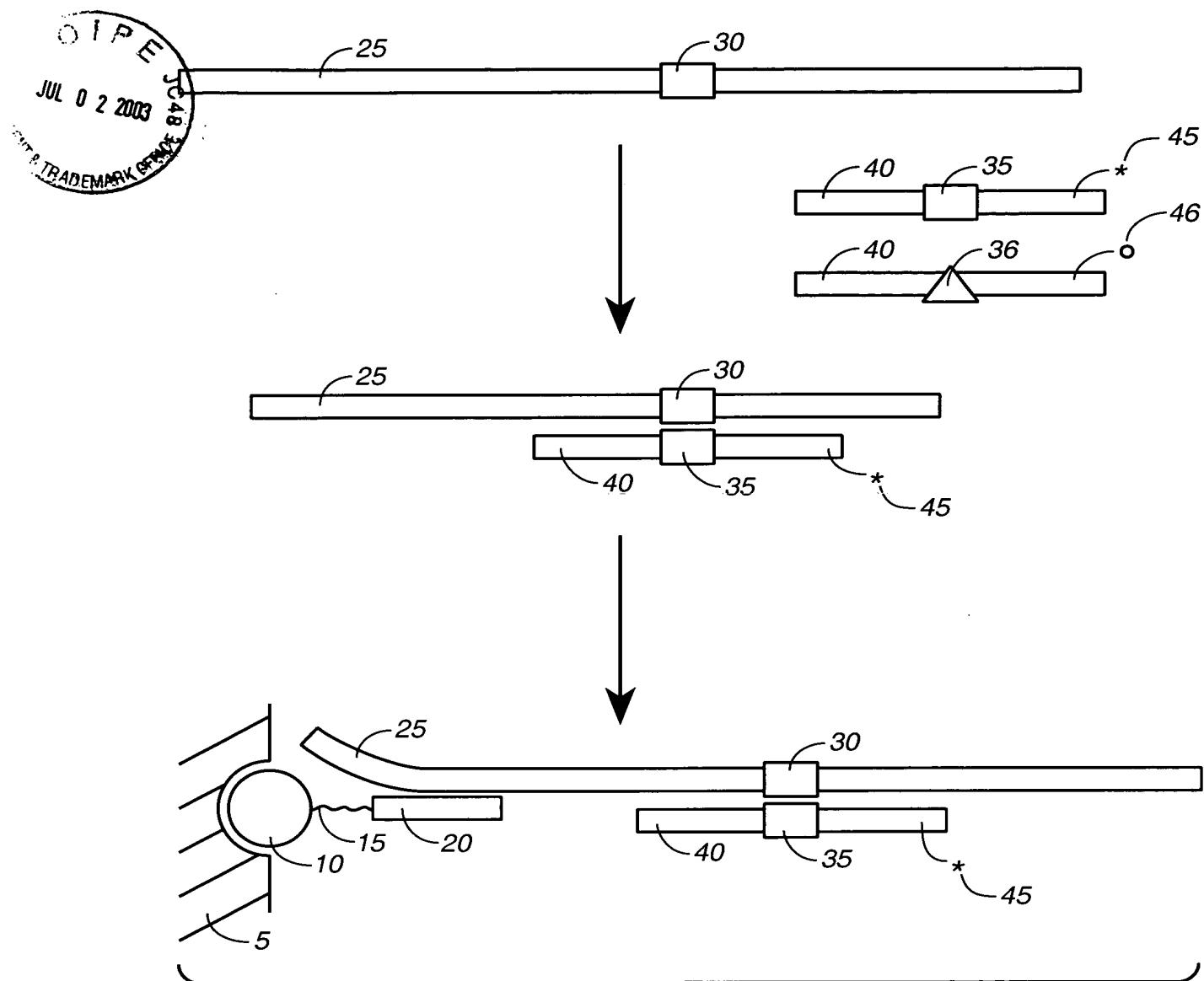
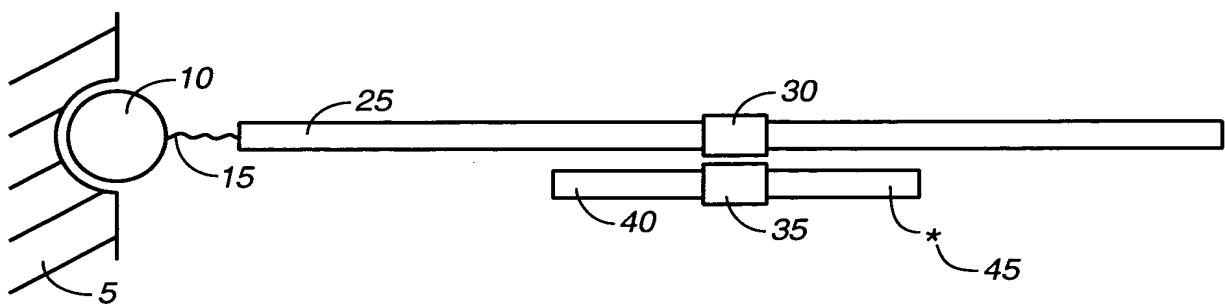
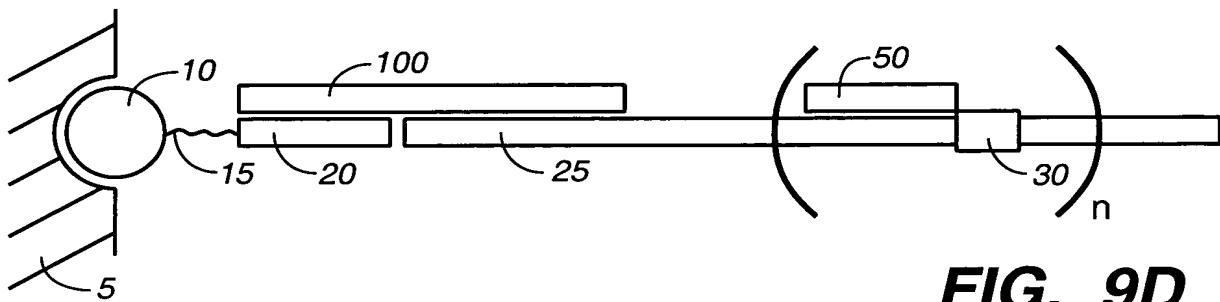
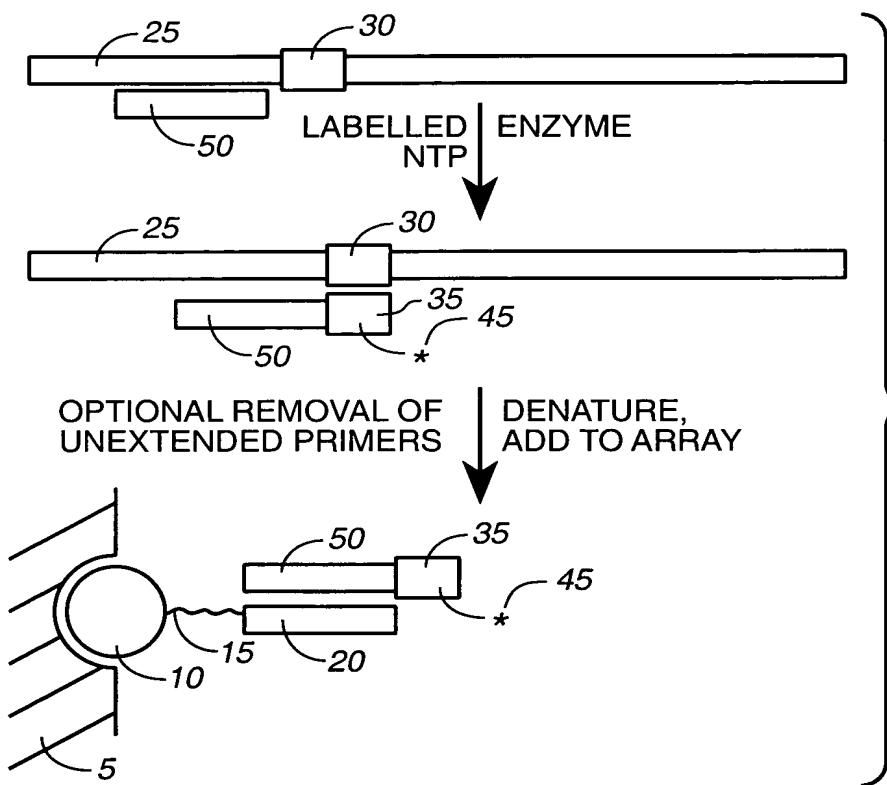
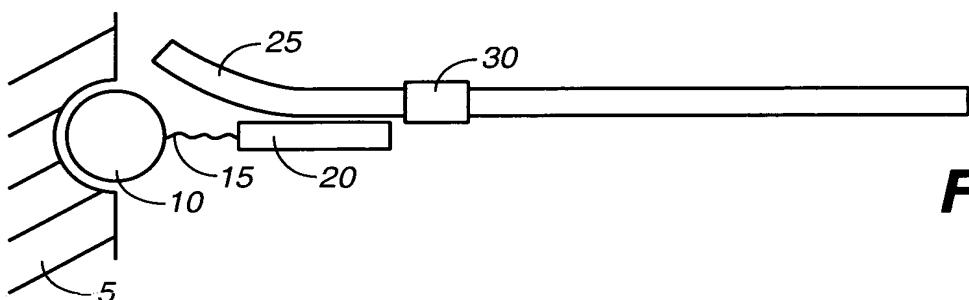
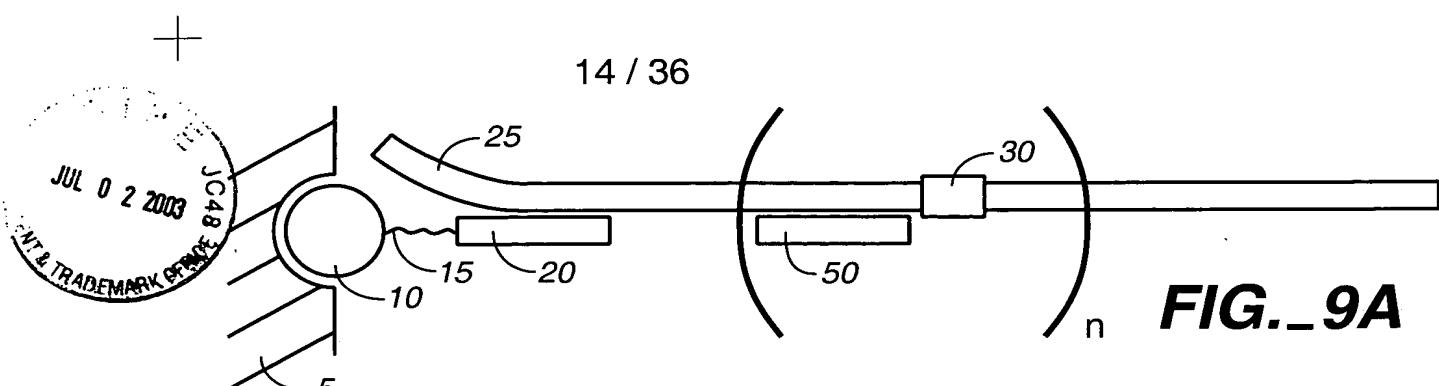
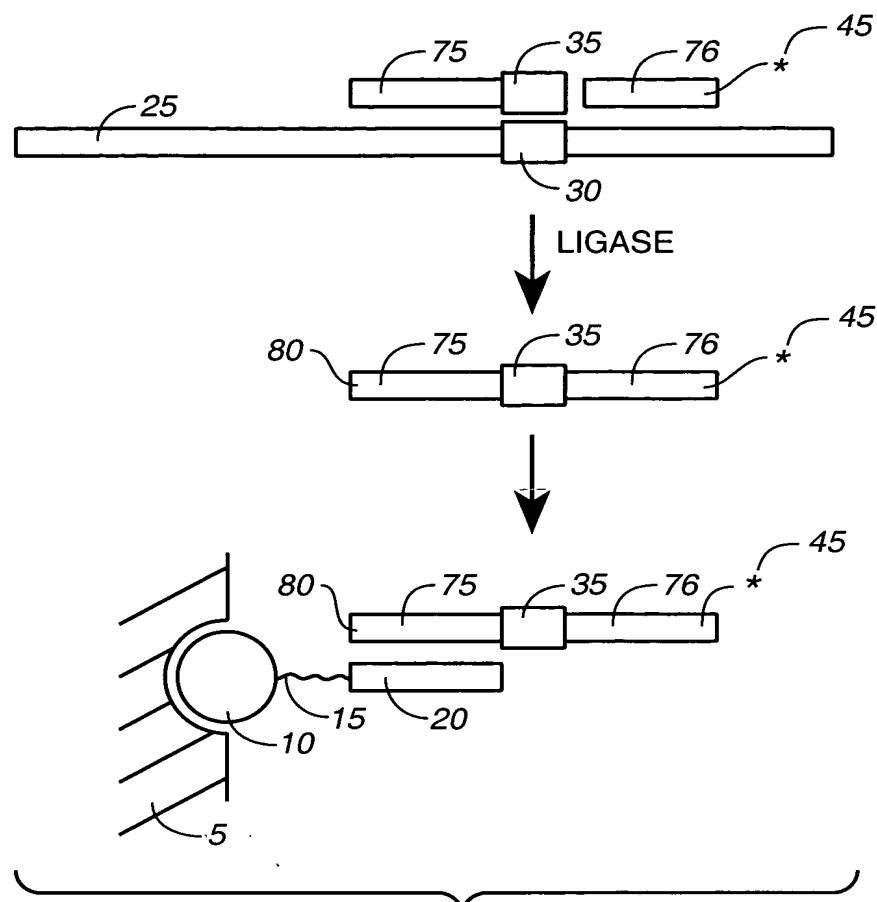


FIG. 7C

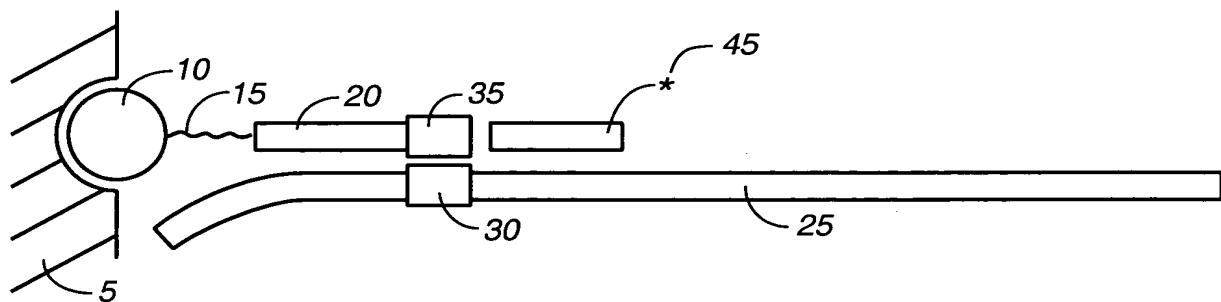
**FIG. 8A****FIG. 8B****FIG. 8C**

**FIG.\_8D****FIG.\_8E**



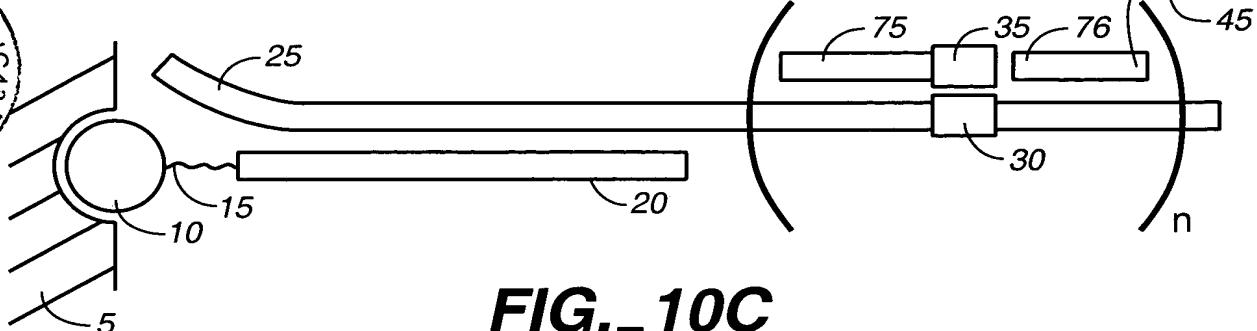
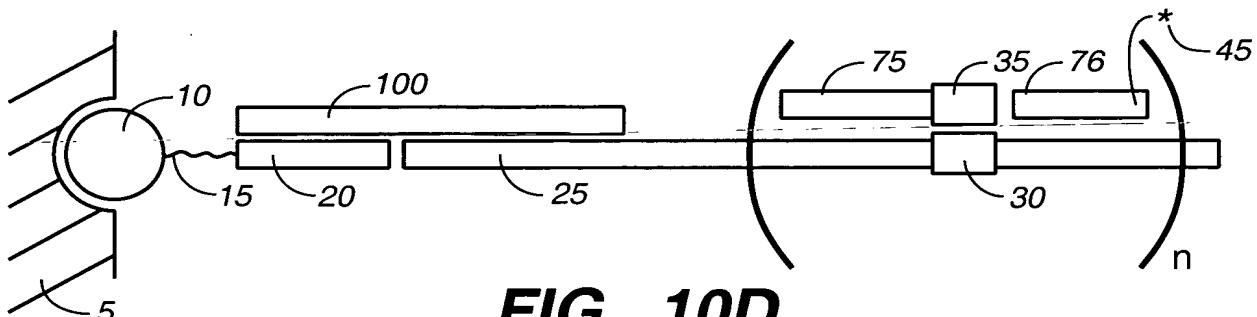
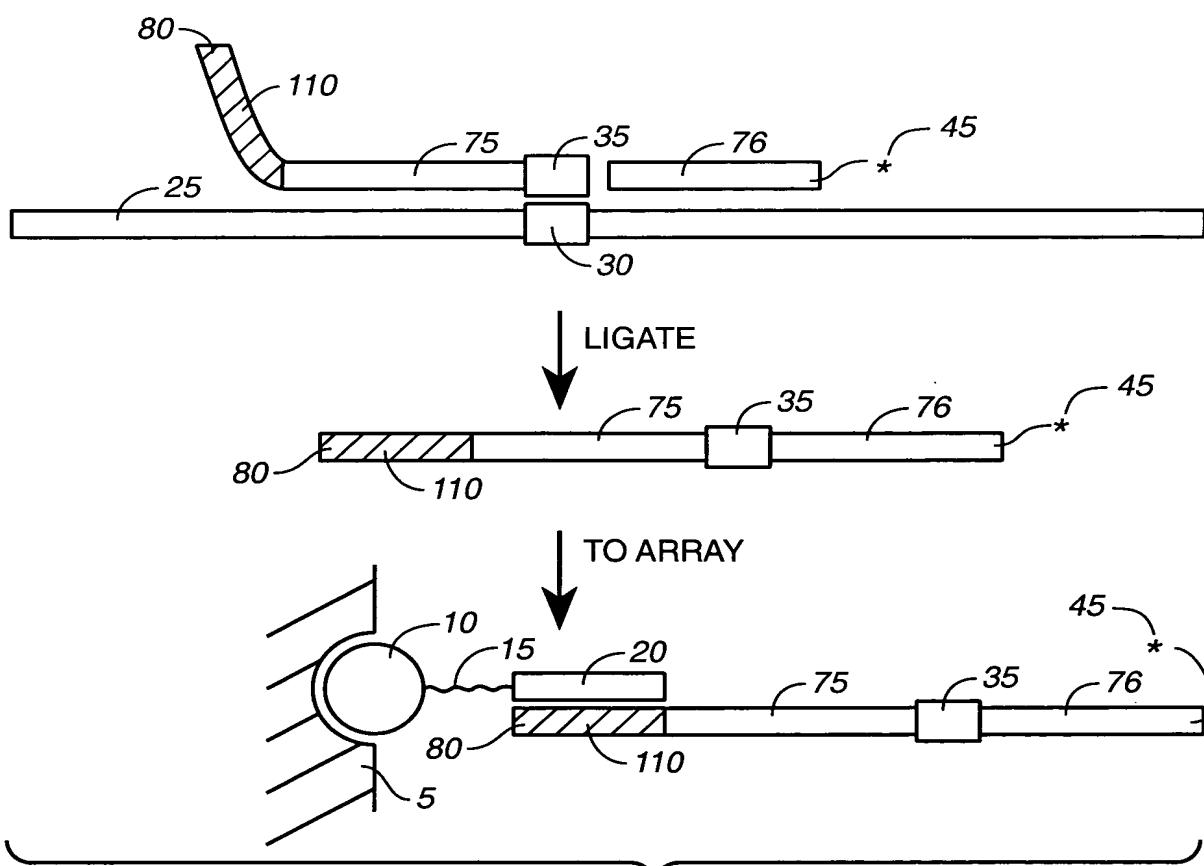


**FIG.\_ 10A**

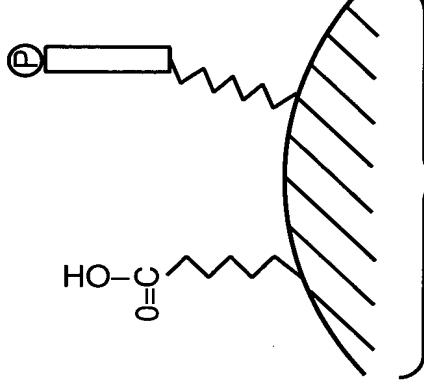
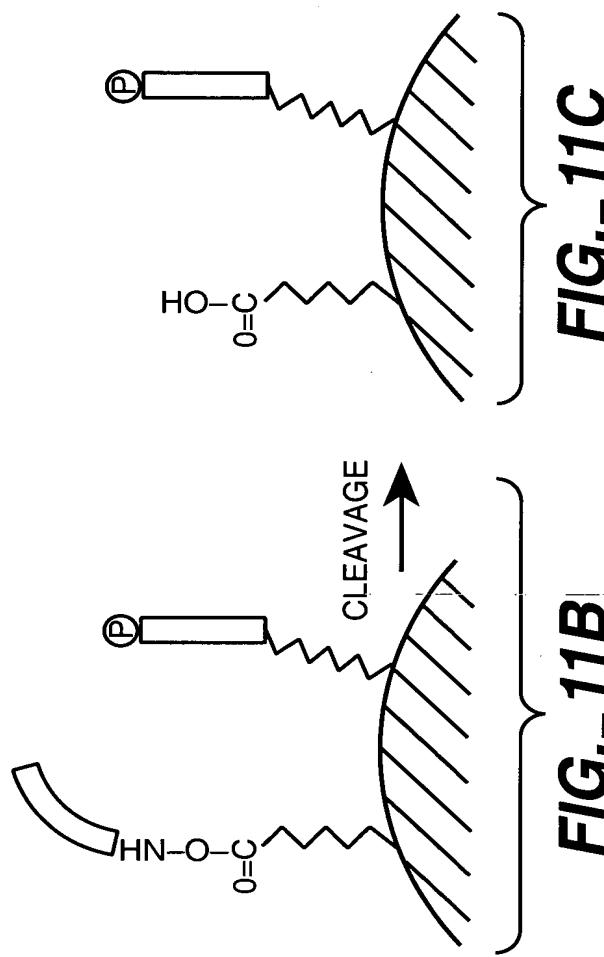
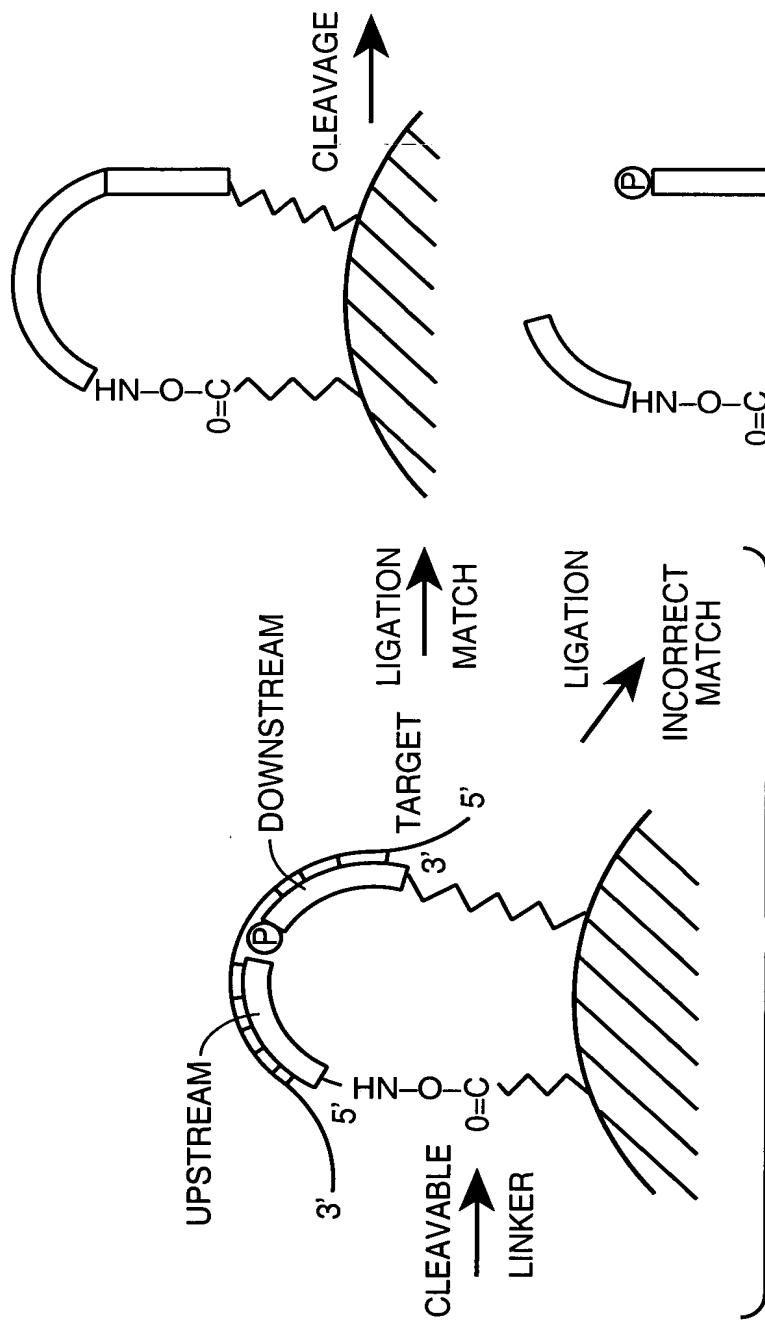


**FIG.\_ 10B**

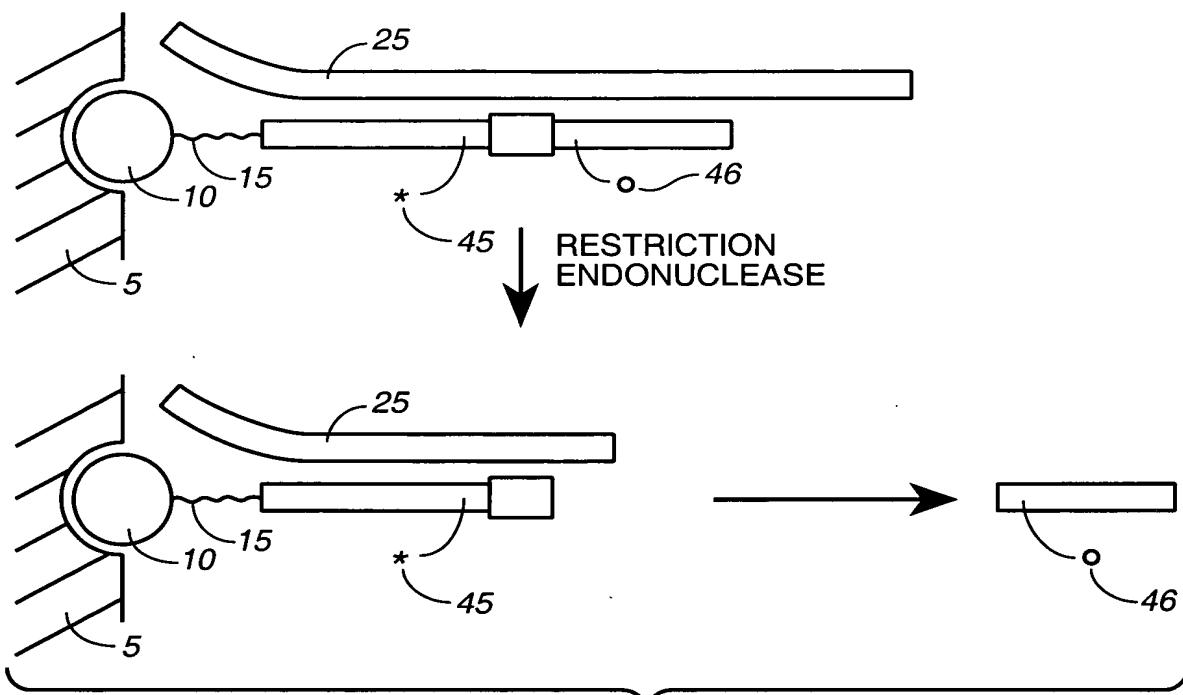
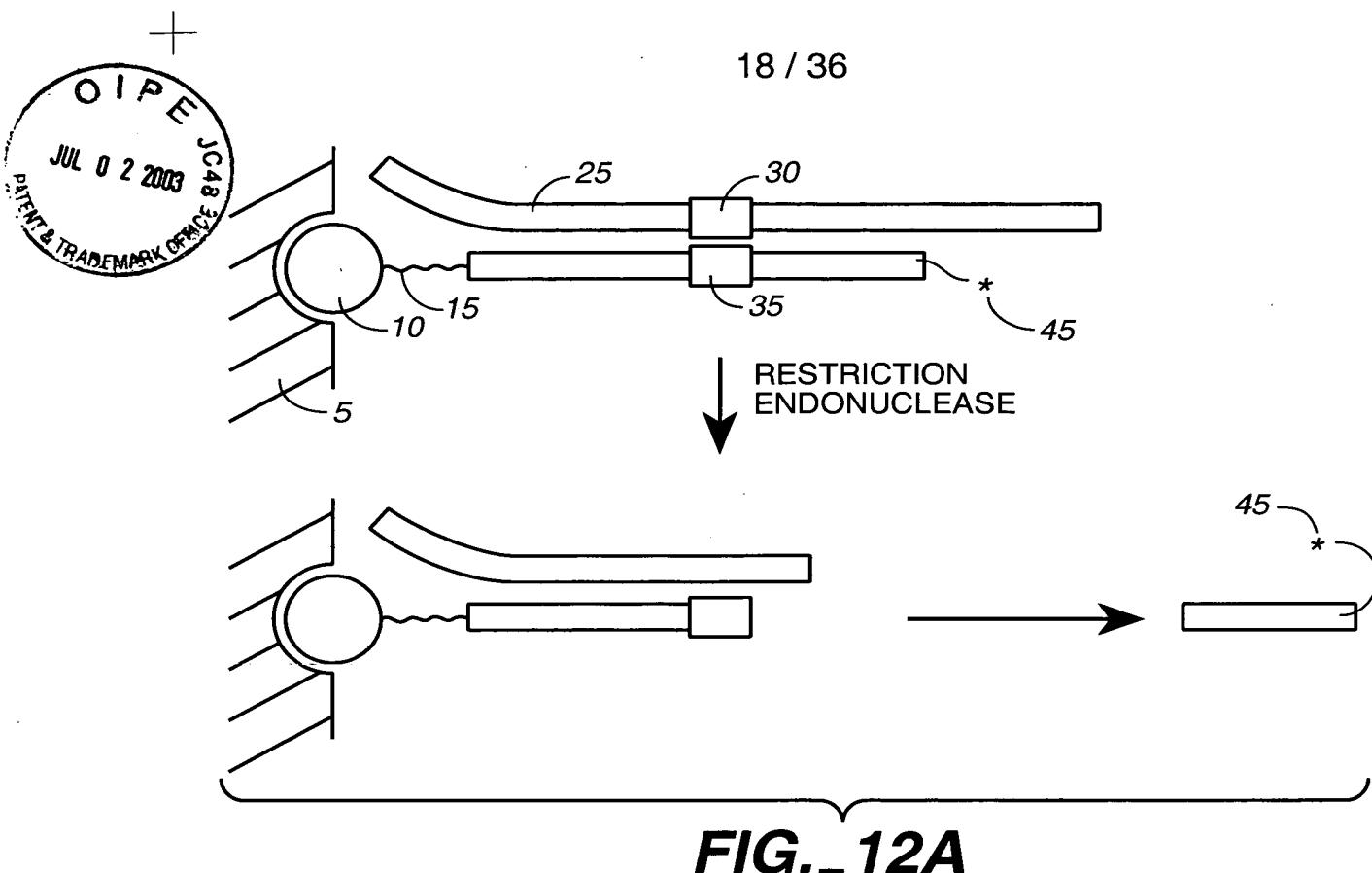
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**FIG. 10C****FIG. 10D****FIG. 10E**

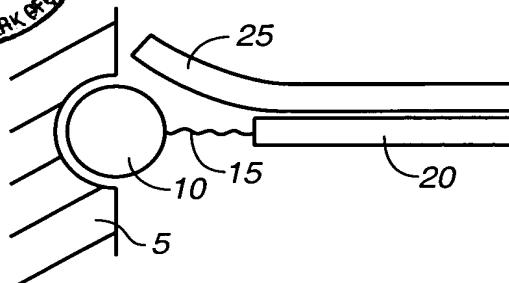
+



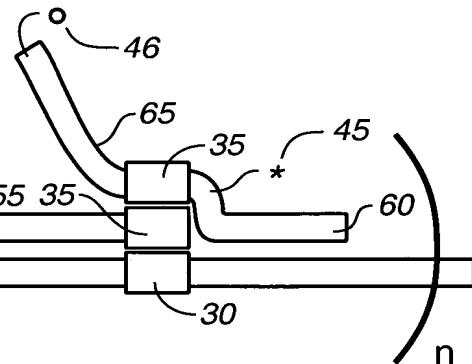
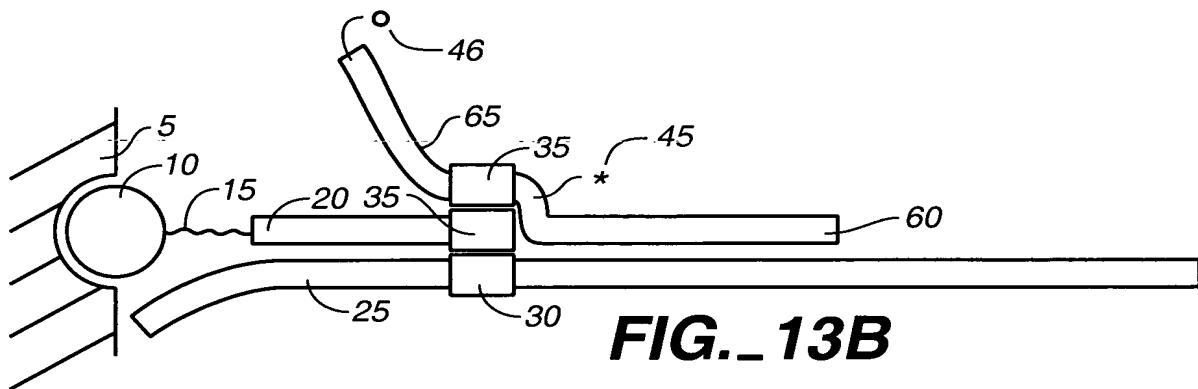
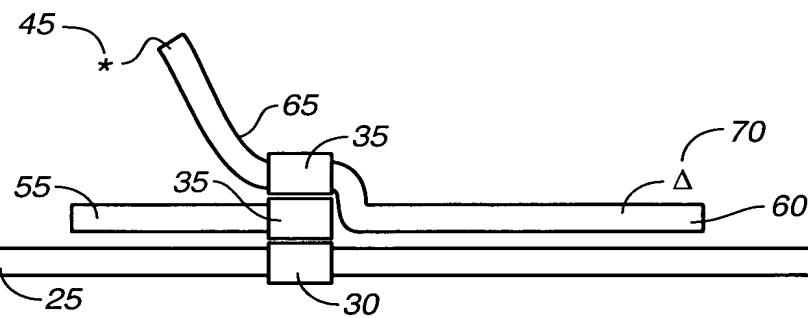
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**FIG. 12B**



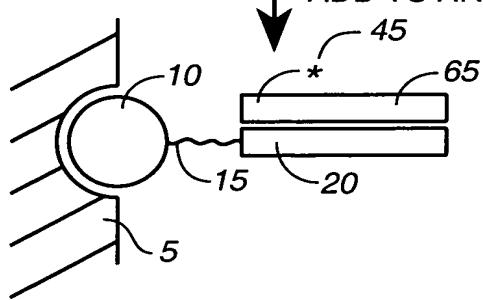
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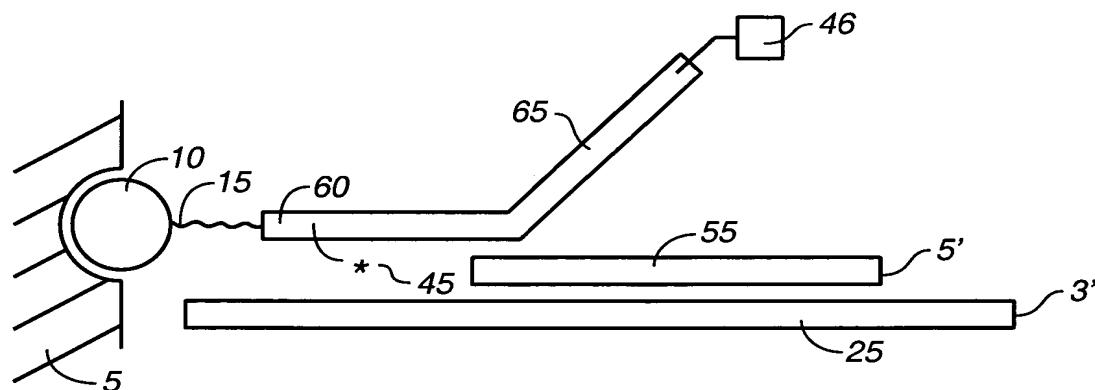
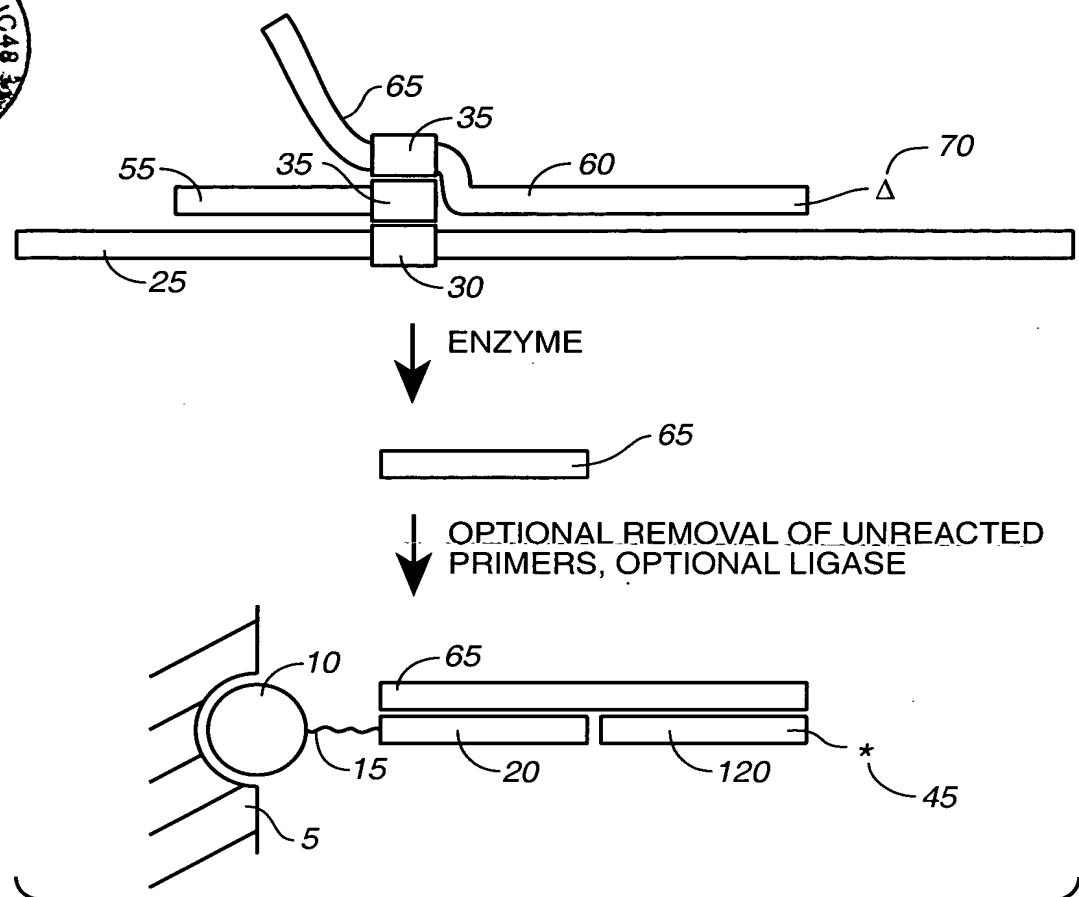
**FIG.\_ 13A****FIG.\_ 13B**

ENZYME

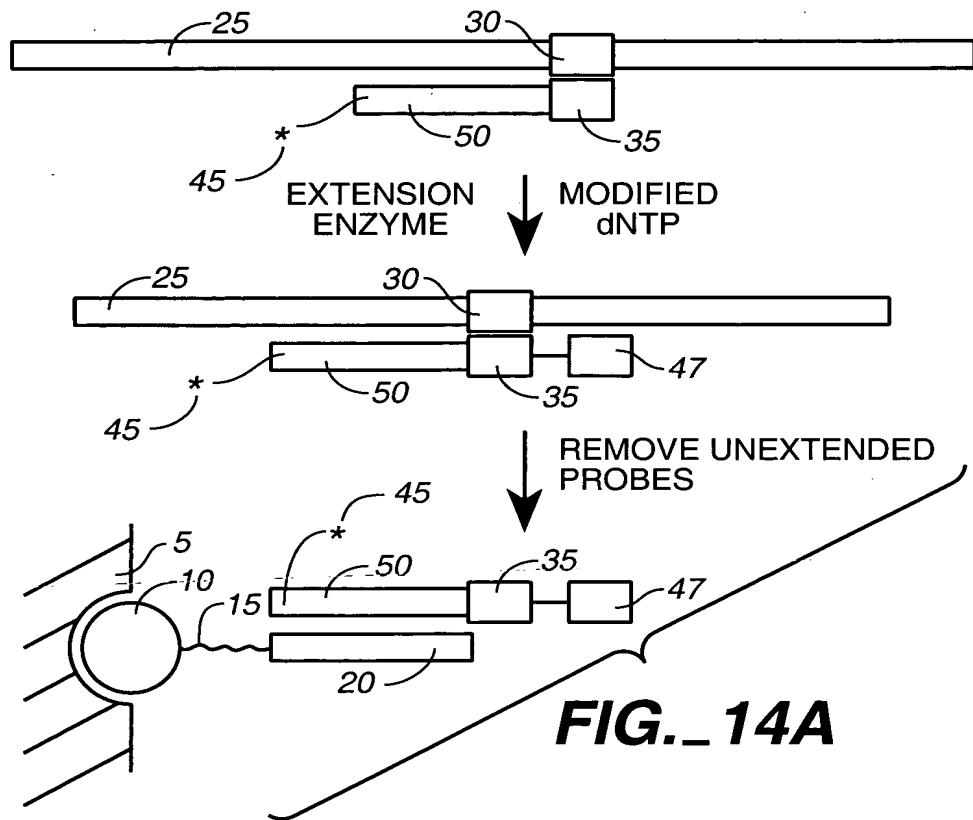
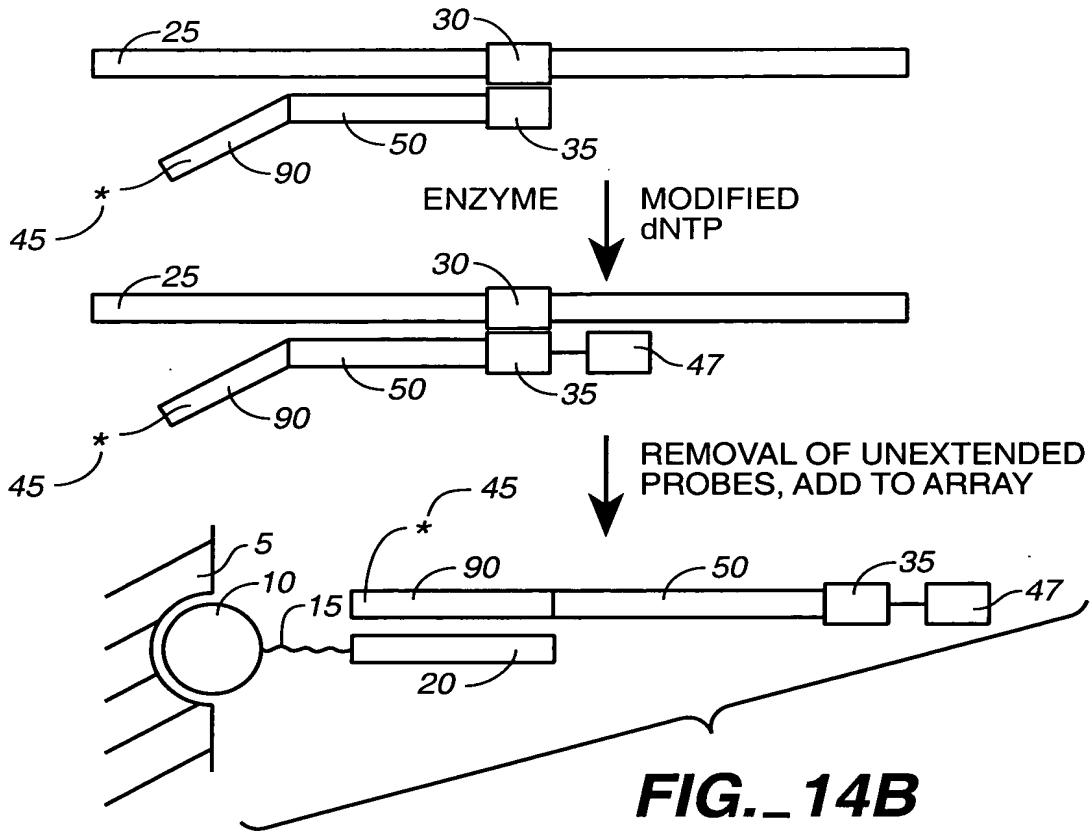


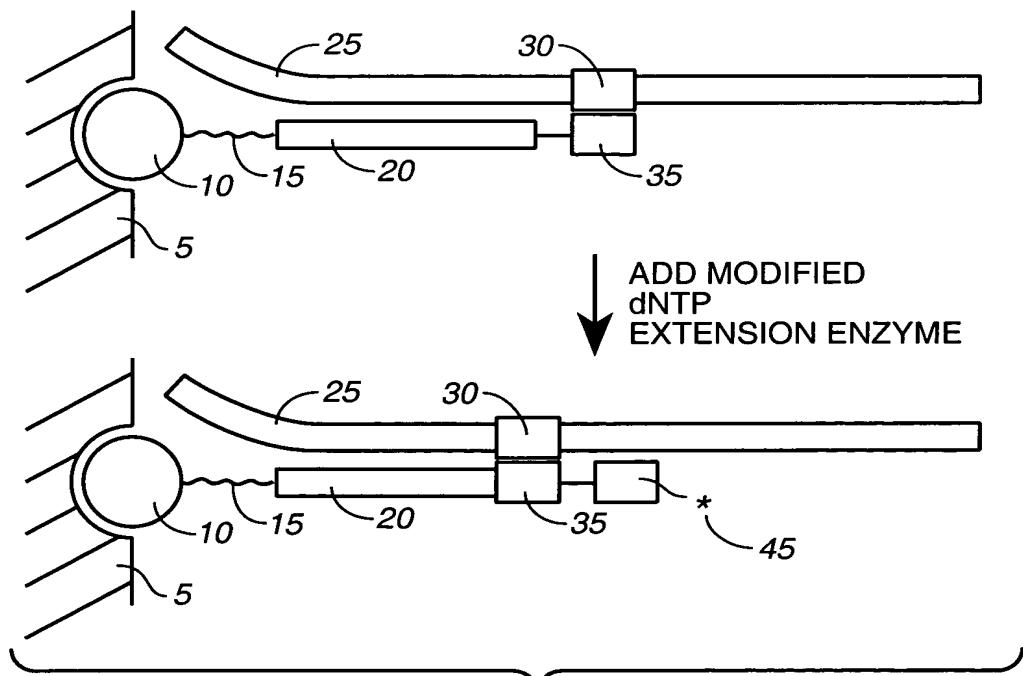
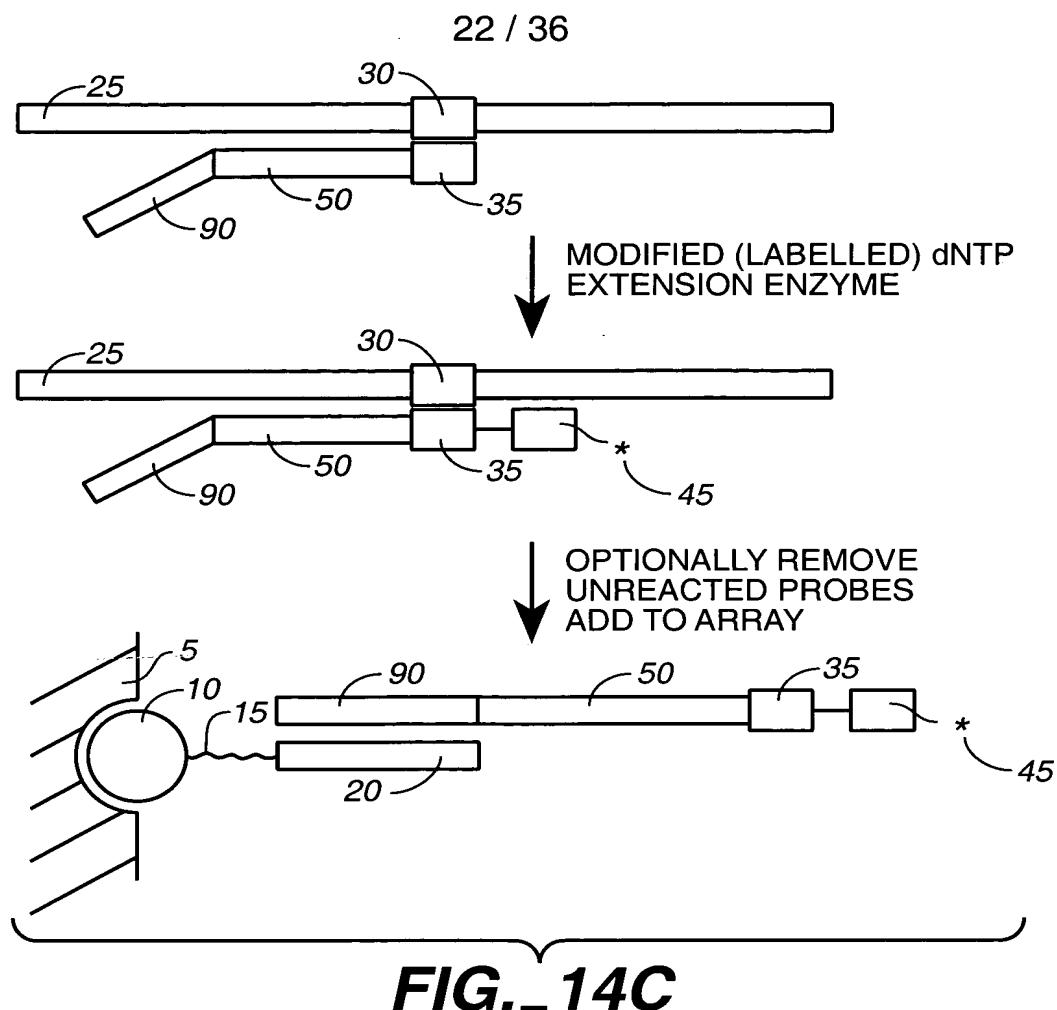
OPTIONAL REMOVE  
UNCLEAVED SIGNAL PROBE,  
ADD TO ARRAY

**FIG.\_ 13C**

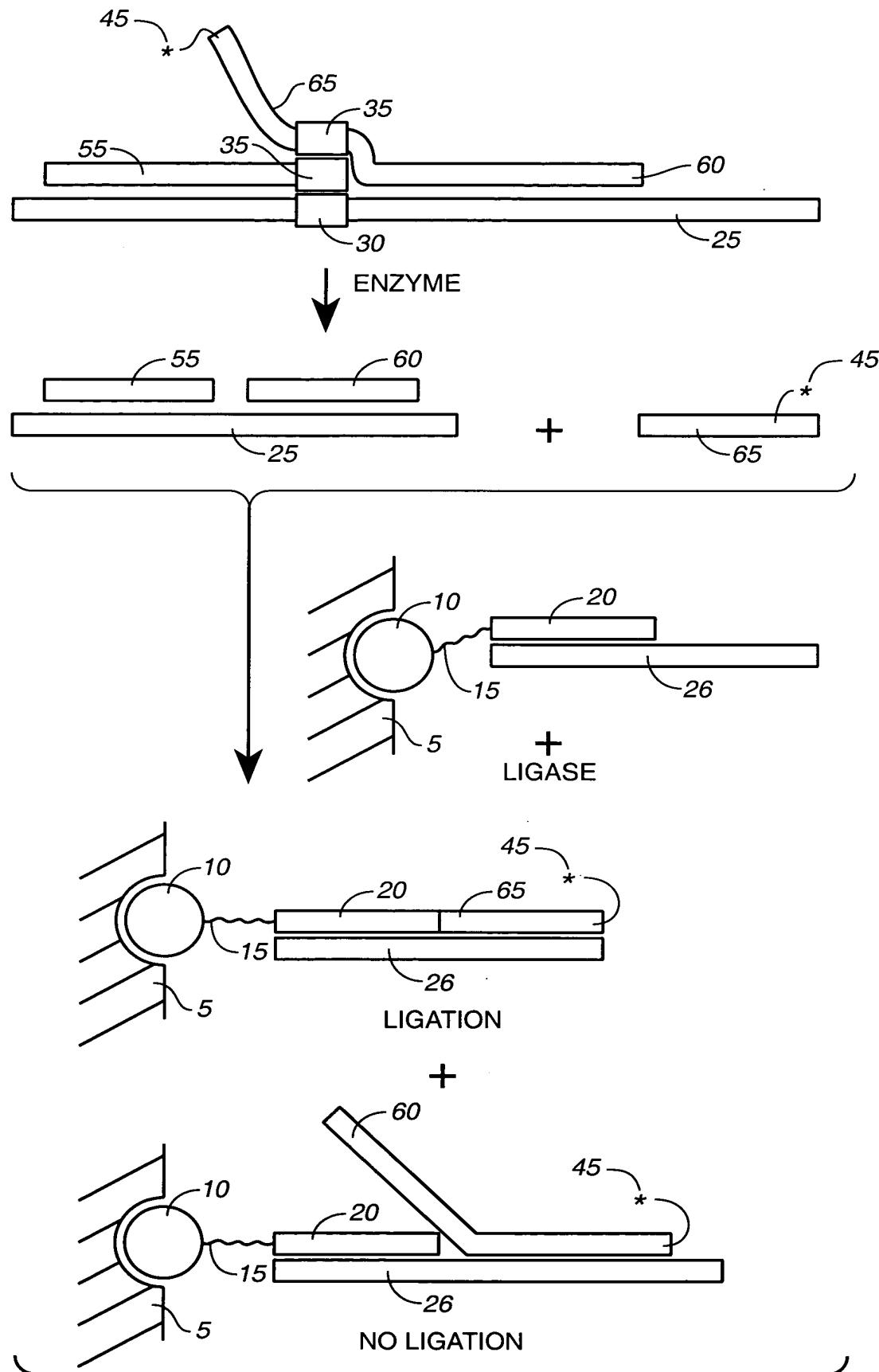


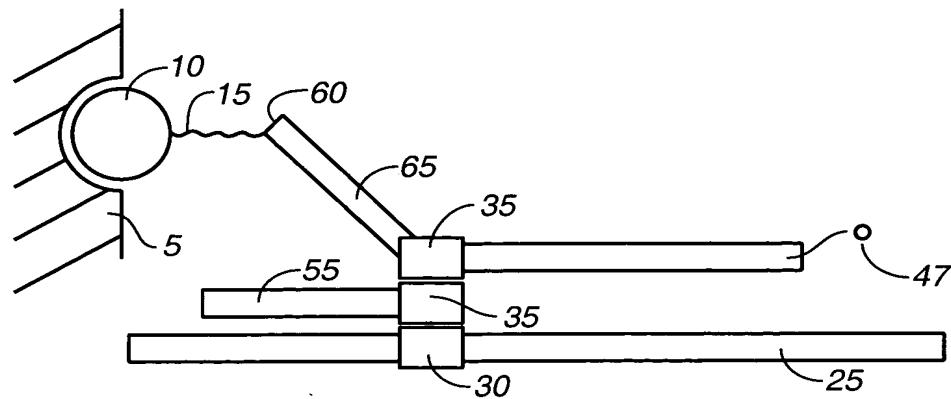
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**FIG.\_ 14A****FIG.\_ 14B**

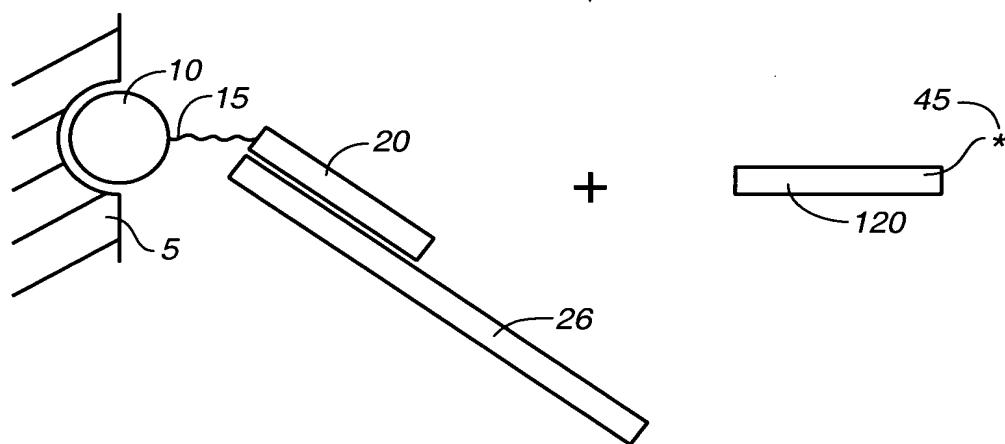


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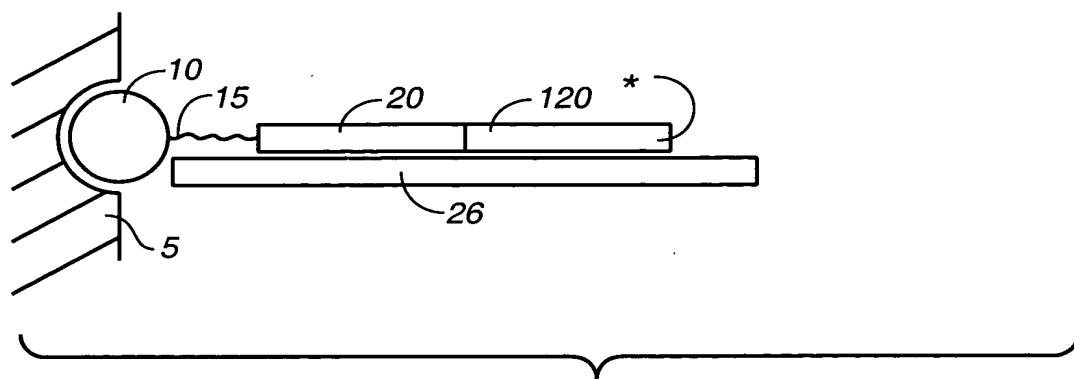
**FIG.\_15A**



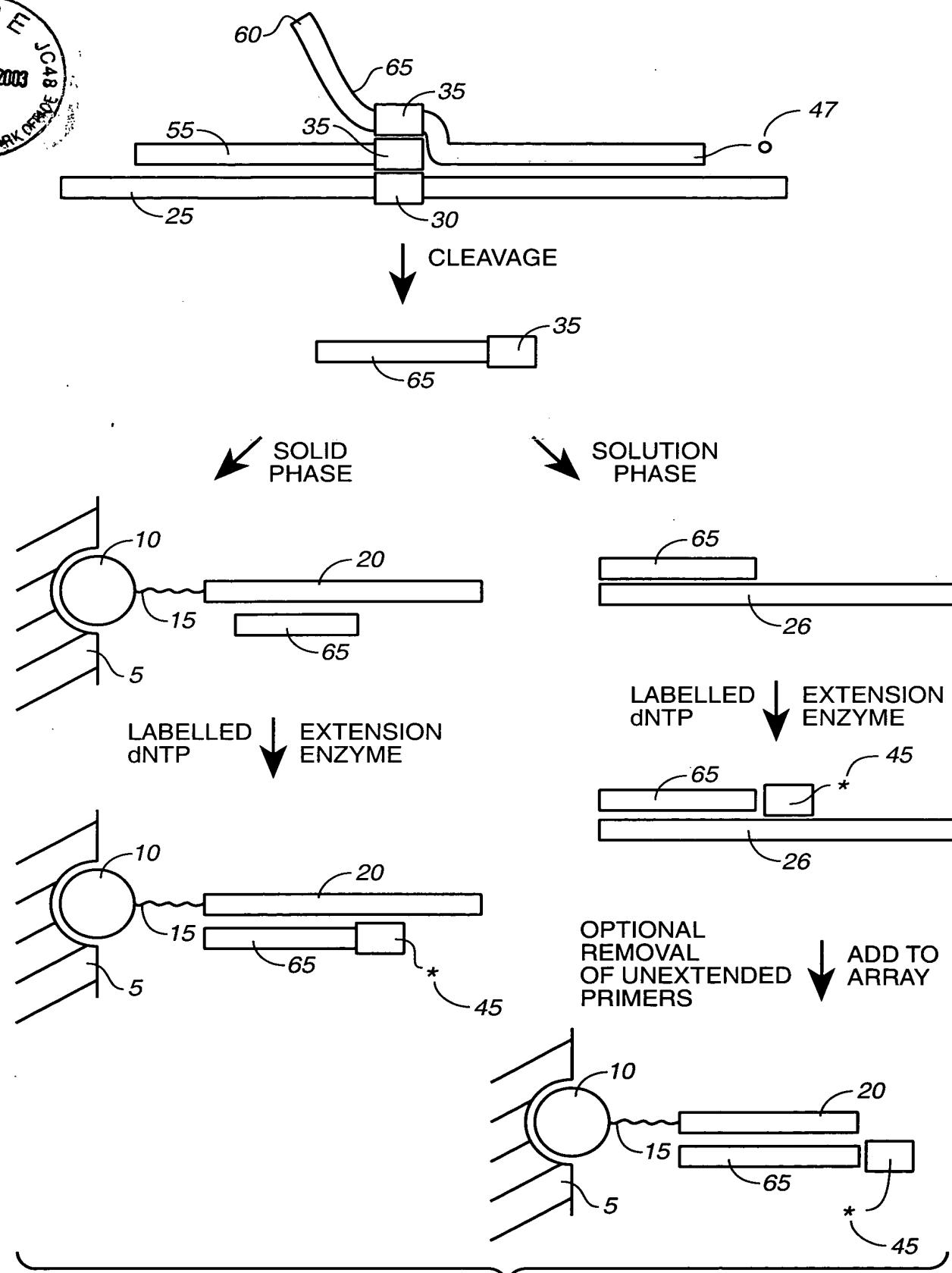
CLEAVAGE ENZYME  
TARGET TEMPLATE

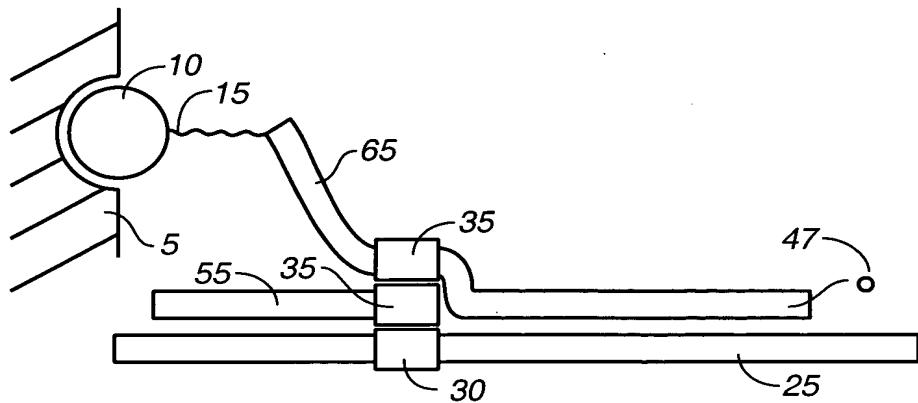


LIGATION

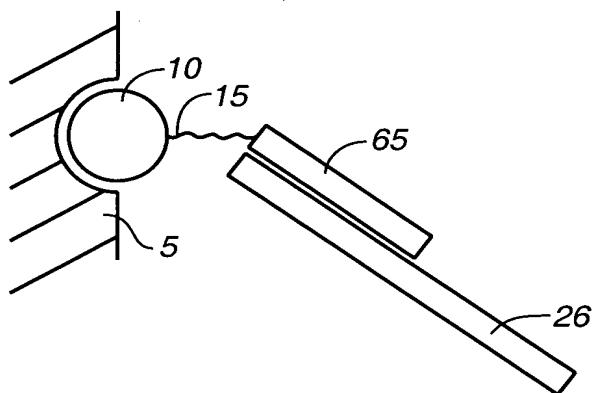


**FIG.\_15B**

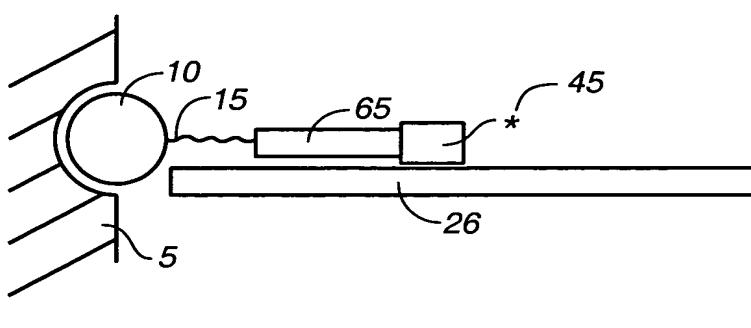
**FIG.\_16A**



↓ CLEAVAGE  
ADD TARGET TEMPLATE

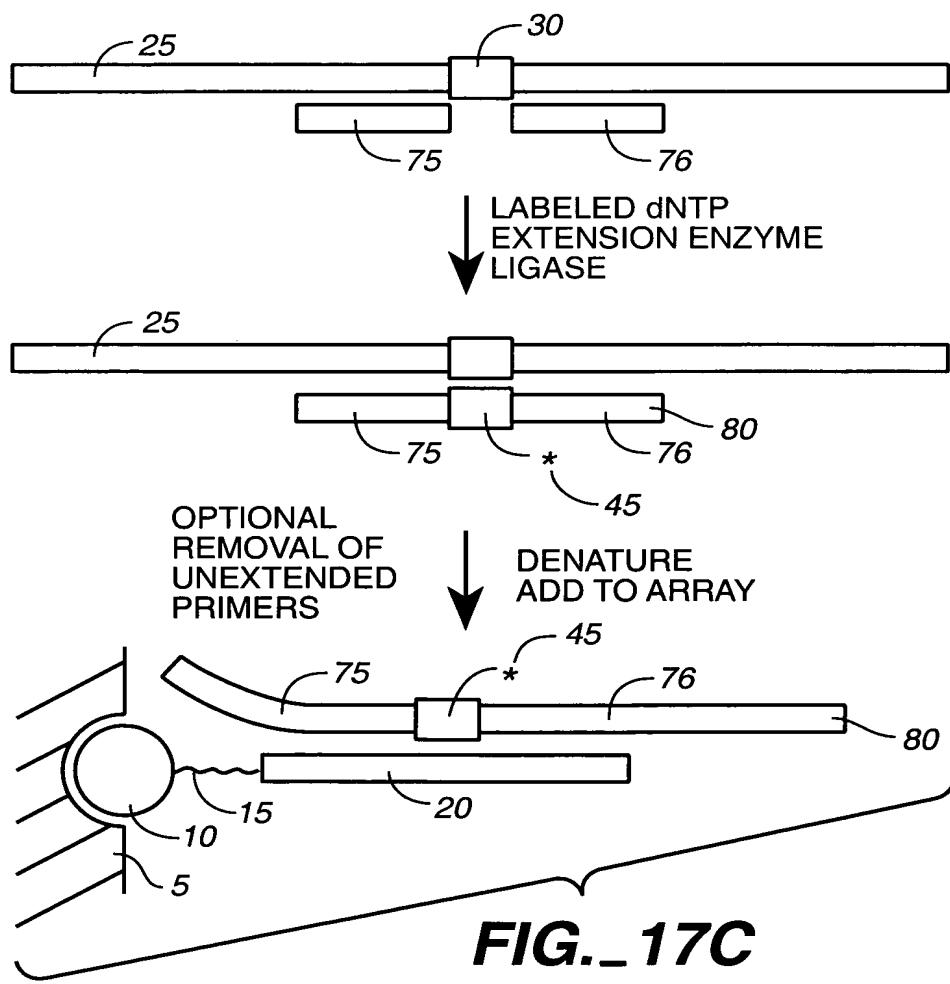
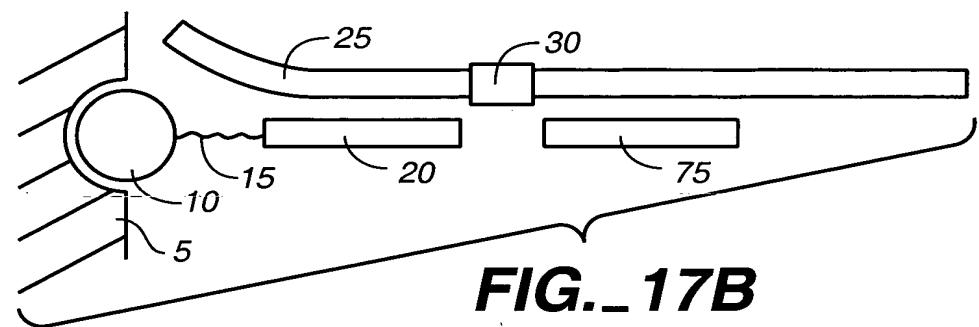
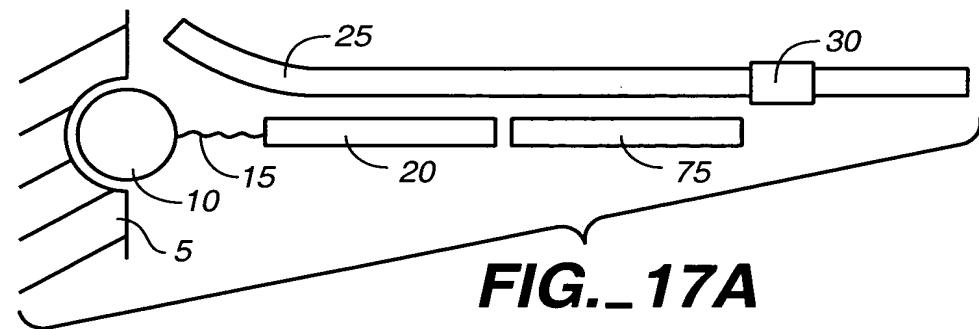


LABELLED  
dNTP ↓ EXTENSION  
ENZYME



**FIG.\_ 16B**

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3' CCC ————— TTTTTTTT-P5' cDNA

(1) CIRCULARIZE cDNA WITH GUIDE LINKER



GGGAAAAA  
CCCCTTTTTTTT  
P

(2) LIGATE



GGGAAAAA  
CCCTTTTTTTT

(3) EXTEND AS ROLLING CIRCLE



GGGAAAAA

CCCTTTTTTTT

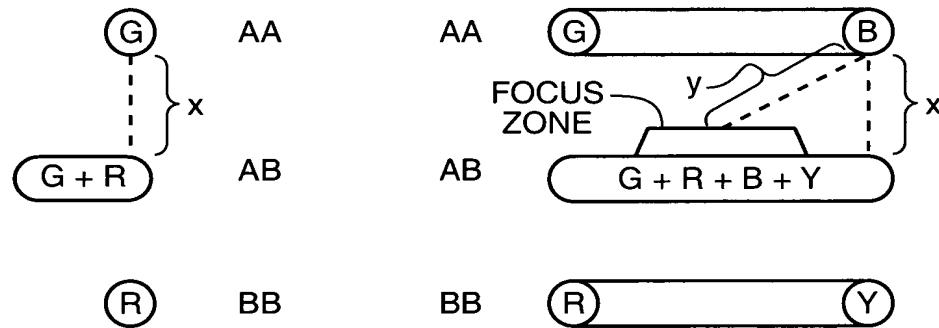
**FIG.\_18**

SINGLE LABELED PROBE

GENOTYPE	SIGNAL
AA	G / G
AB	G / R
BB	R / R

MULTI-LABELED PROBE

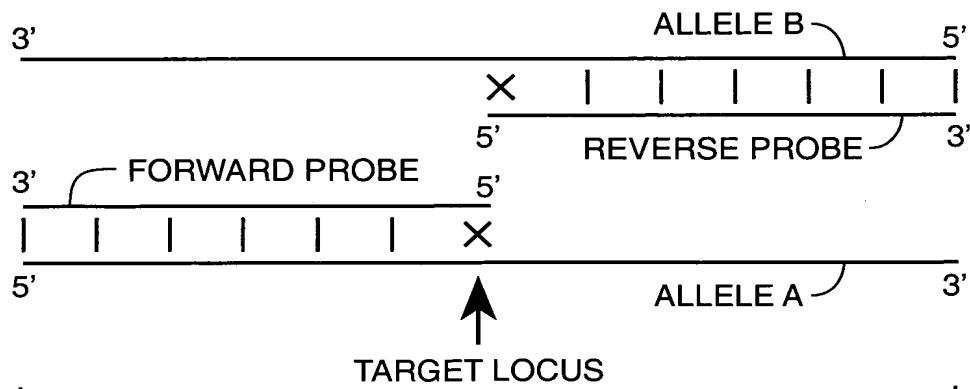
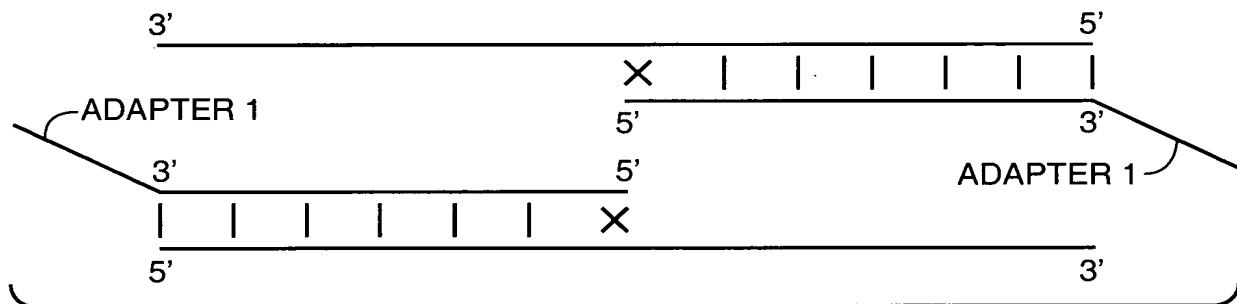
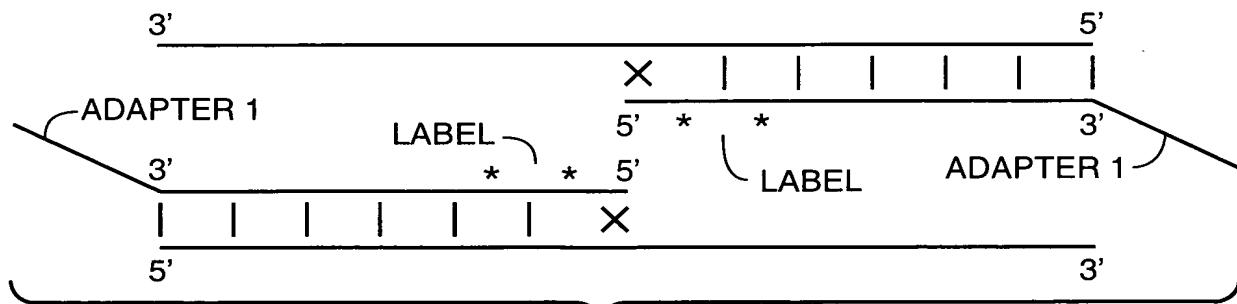
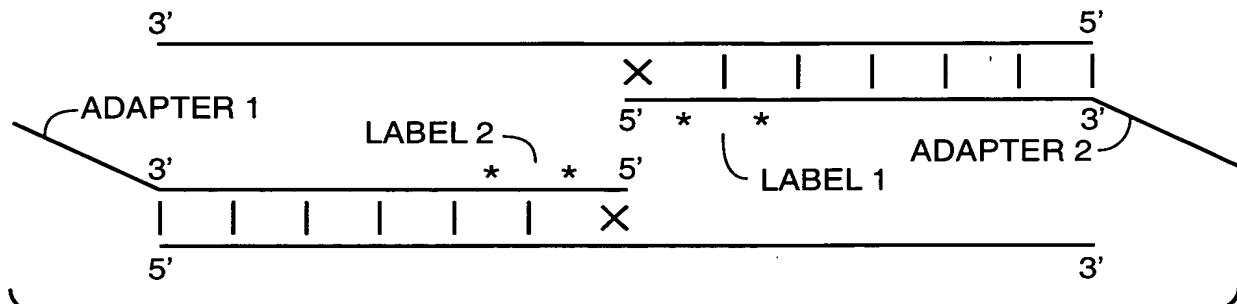
GENOTYPE	SIGNAL
AA	G,B / G,B
AB	G,B / R,Y
BB	R,Y / R,Y

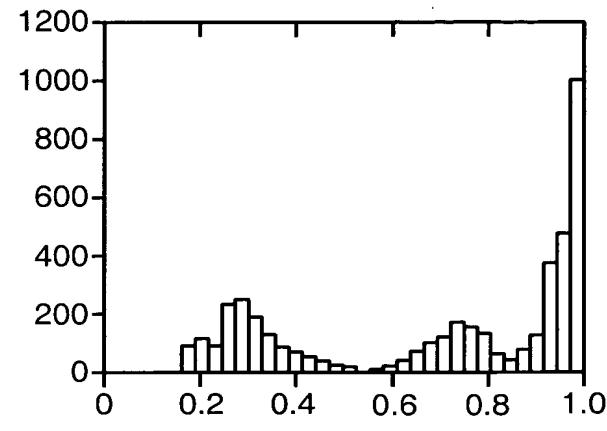
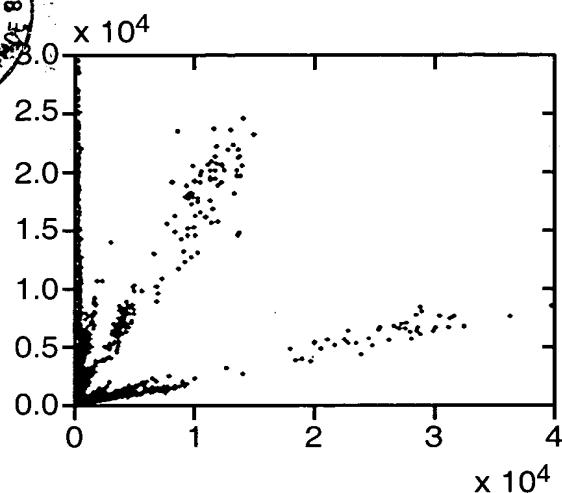
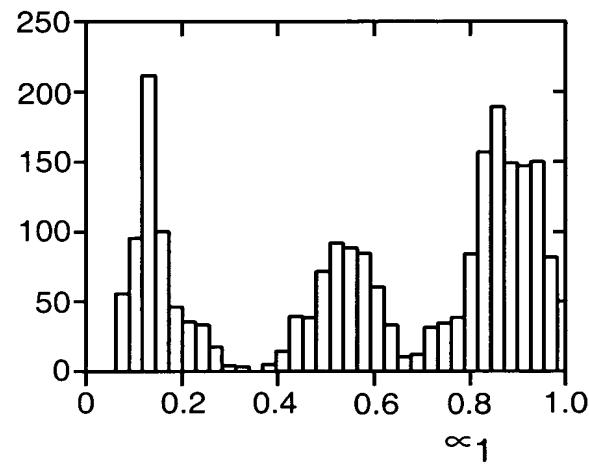
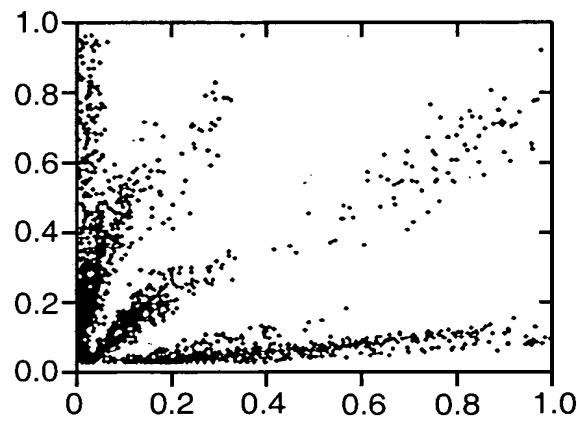
SIGNAL RANGE

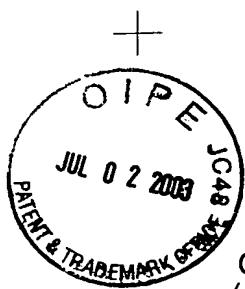
x = SINGLE LABEL DISTANCE  
 y = MULTI-LABEL DISTANCE

**FIG.\_19**

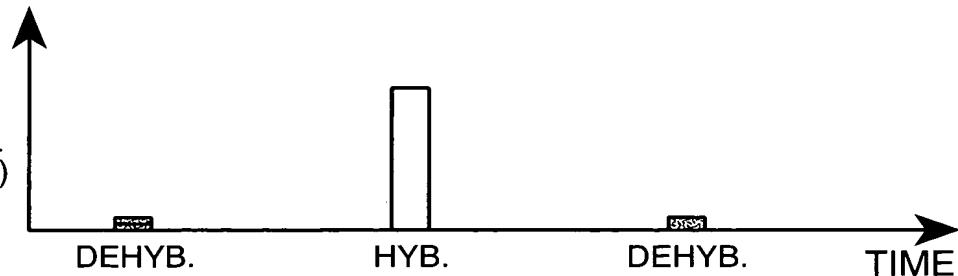
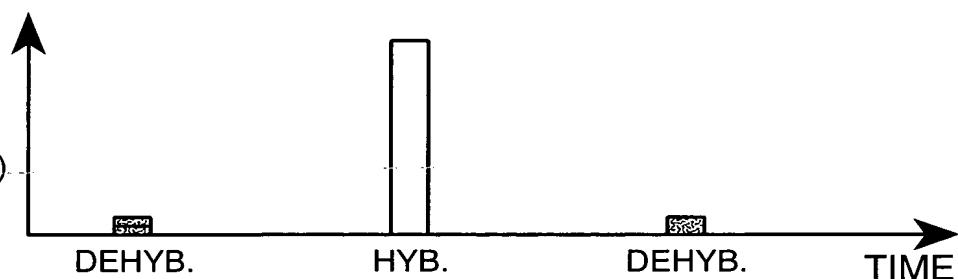
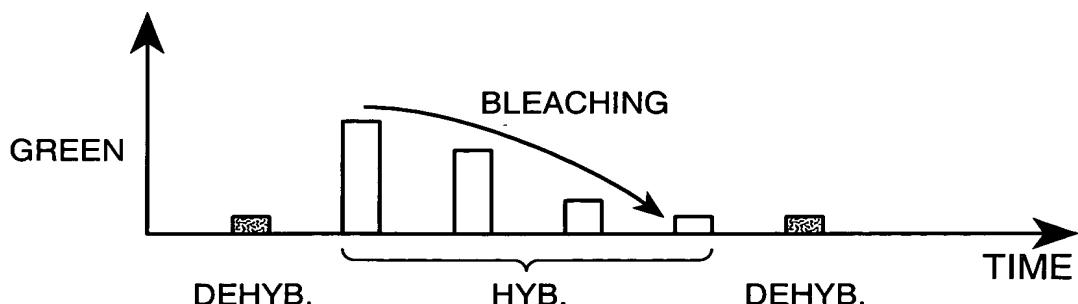
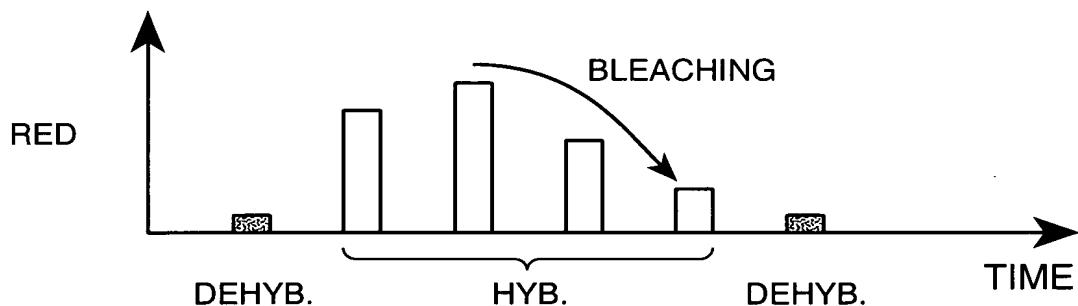
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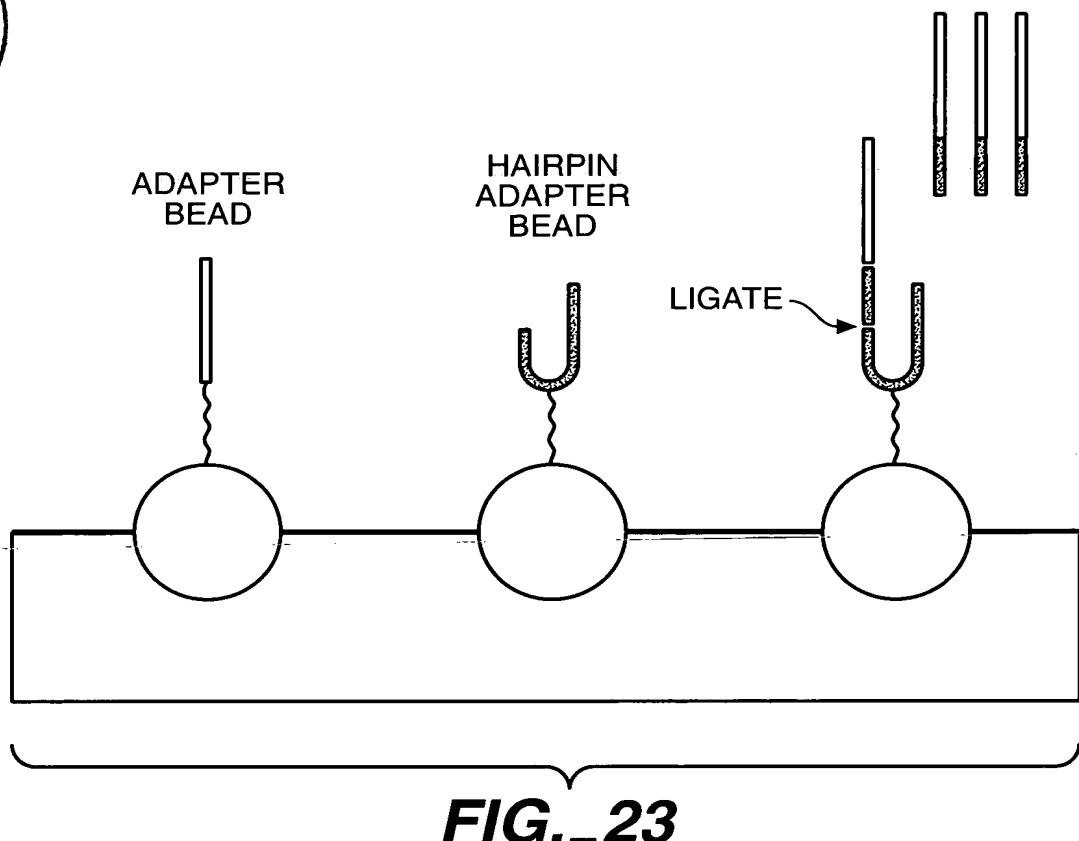
**FIG.\_20A****FIG.\_20B****FIG.\_20C****FIG.\_20D**

**BEFORE NORMALIZATION****AFTER NORMALIZATION****FIG.\_21**



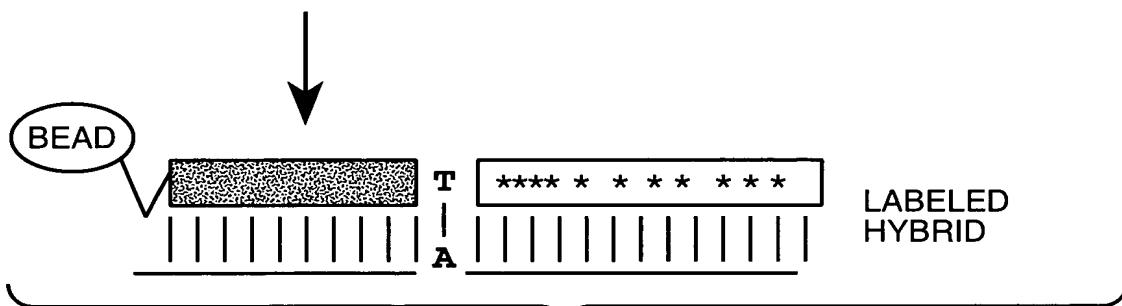
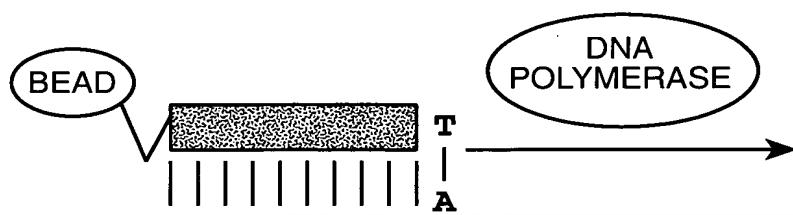
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RED  
CHANNEL  
(ALLEL E A)GREEN  
CHANNEL  
(ALLEL E B)**FIG.\_22A****FIG.\_22B**

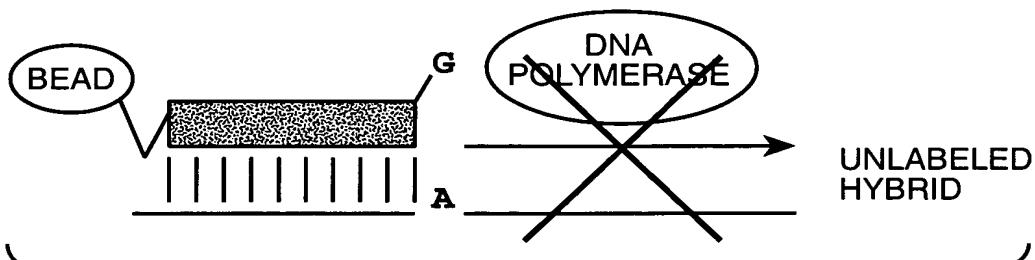




## MATCH TO SNP ALLELE

**FIG.\_24A**

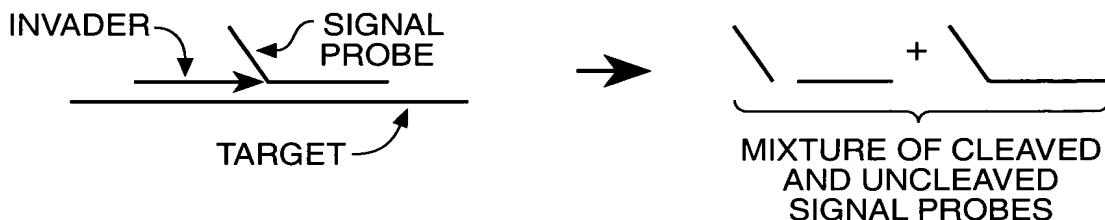
## MISMATCH TO SNP ALLELE

**FIG.\_24B**



## INVADER - PCR

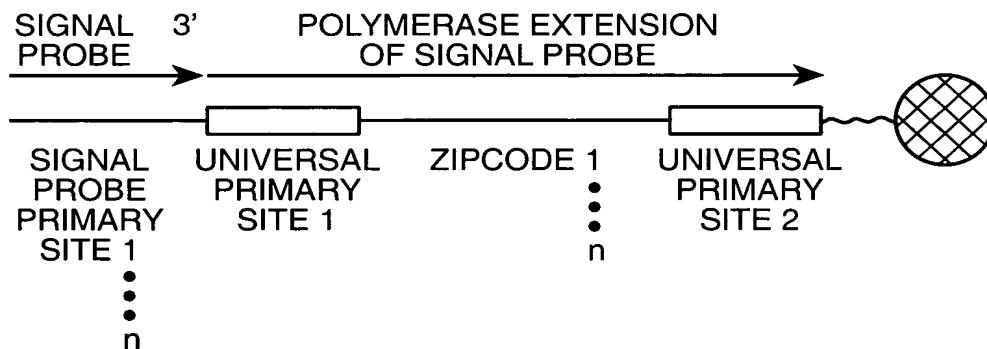
## 1) INVADER REACTION



## 2) REMOVAL OF UNCLEAVED SIGNAL PROBES



## 3) SIGNAL PROBE PRIMES SYNTHESIS OF AMPLICON TARGET STRAND

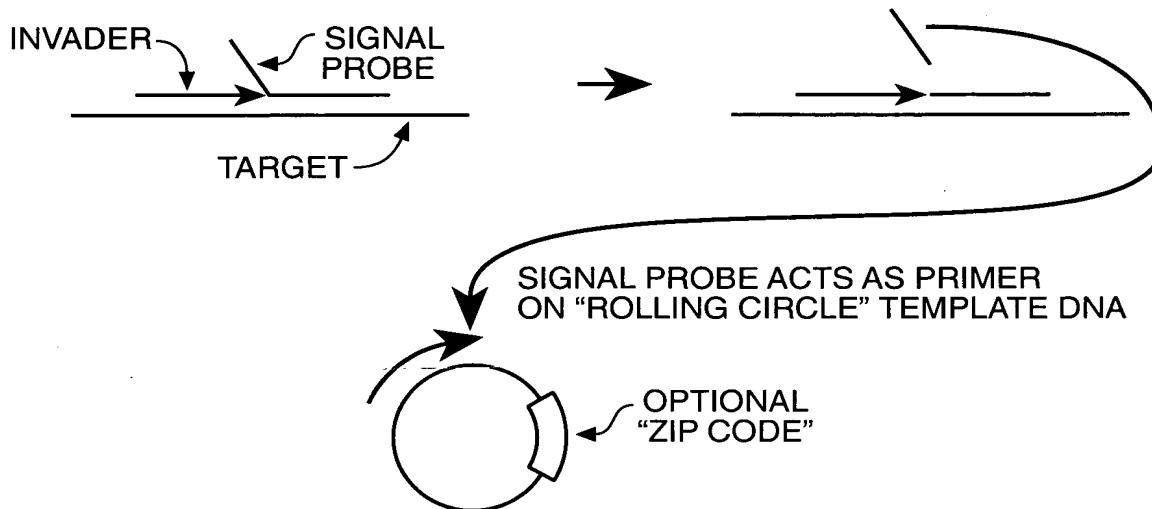
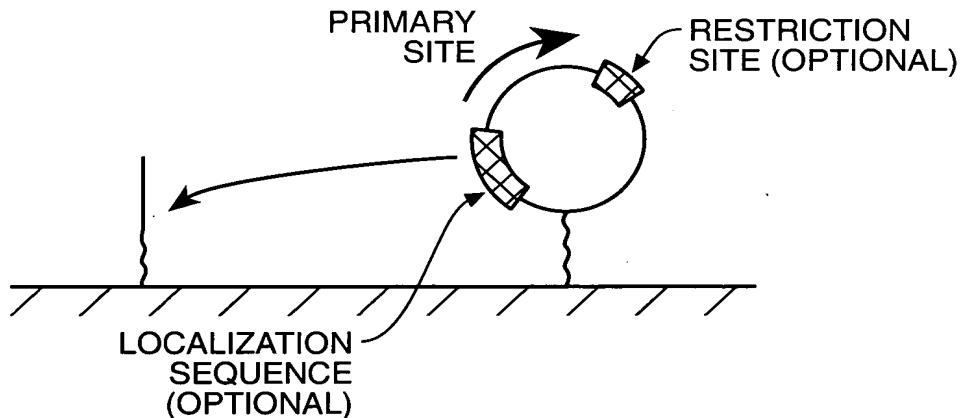


## 4) PCR AMPLIFICATION

NEWLY SYNTHESIZED TARGET STRANDS ARE DENATURED FROM TEMPLATE AND TRANSFERRED TO PCR REACTION (UNIVERSAL PRIMERS, dNT's, TAQ POLYMERASE) FOR MULTIPLEX PCR. UNIVERSAL PRIMERS ARE LABELLED E.G. WITH BIOTIN.

## 5) ARRAY HYBRIDIZATION - PCR AMPLICONS CONTAINING ZIPCODES ARE HYBRIDIZED TO ARRAY.

FIG.\_25

**INVADER - ROLLING CIRCLE****1) INVADER REACTION****SOLID PHASE VERSION:**

ROLLING CIRCLE TEMPLATE IS TETHERED TO SURFACE E.G. TO LOCALIZED "FEATURES" IN ARRAY FORMAT, OR TO BEADS.

ROLLING CIRCLE PRODUCTS CAN BE LOCALIZED E.G. BY HYBRIDIZATION TO ADJACENT PROBES OR RECOVERED IN LIQUID PHASE FOR HYBRIDIZATION TO A DETECTION ARRAY, E.G. BY ENZYMATIC CLEAVAGE.

**FIG.\_26**